METHOD OF CUSTOM-TAILORING FOUNDATION GARMENT

BACKGROUND OF THE INVENTION:

1. Field of the Invention:

This invention relates to a method of making a foundation garment suited to the body figure of a customer and imparting a desired well-proportioned wearing figure to the body, in compliance with the order of the customer.

2. Statement of Related Art:

In general, foundation garments such as brassiers, girdles, bodysuits, corsets or the like are commercially available as ready-made ones in a wide variety of sizes, from which consumers or customers choose and wear an individual undergarment assumed to be adapted to their own sizes.

These foundation garments are expressed only in terms of girth sizes of limited body parts, e.g. top bust, bottom bust, waist, hips, etc. and consequently, it is difficult for everyone to make available an individual foundation garment having good compensating effect for the body and good fittability to the body.

With recent disposition to or propensity for high-quality foundation garments and body-conscious fashion, an individual foundation garment suited to the individual body has been made to order.

According to existing custom-making method of such undergarments, it is customary to take sizes of a customer,

to compare resulting size values with values of a pre-determined standard size model corresponding to the customer, to displace partly pattern points defining the standard size model and to cut out paper patterns based on the displaced pattern points thereby to obtain compensated sizes, as is seen, for example, in the custom-making of clothes disclosed in Japanese Patent Publication No. 4-23001(1992)B.

That is to say, the existing method resides in simply measuring dimensions of specified body parts, without grasping the whole body as a 3-D figure and thus neglects any effect of the undergarment when worn on the overall proportional balance of the body from head to heel. By such partial measurement, a foundation garment partly fitted to the customer's body is obtained, but the undergarment when worn does not always give a desired well-proportioned configuration or contour, depending on differences in types of body figures. This is because the human body will be often changed to a disproportioned figure with aging, for instance, because of drooping of the mammae, deposition of fat on the waist, hips, and abdomen, etc.

SUMMARY OF THE INVENTION:

In view of the present situation described above, this invention is aimed at introducing a concept of a desired well-proportioned body figure for a customer or wearer and applying such a compensation that is not only suited to the body figure of the customer, but also imparts an aesthetic well-proportioned figure desired by the wearer to the extent

not exceeding compensation limits restricted by types of muscular or fleshy constitution and body figure by means of a computer, which preliminarily stores and memorizes such desired compensation data collected from a multitude of persons in all types of body figures, whereby to conform to a trend toward fashionability, diversification of individual desire and disposition to high quality undergarments.

The invention for attaining the foregoing object consists in a method for custom-tailoring a foundation garment suited to the body of a customer or wearer, which comprises preliminarily preparing desired wearing data, including two- and three-dimensional figures and dimensions of predetermined body parts, collected from a multitude of persons in all types of body figures and compensated to give a fitted and well-proportioned figure to the body when a standardized size of a foundation garment is worn by the persons, and storing and memorizing the desired wearing data in a computer memory; measuring dimensions of the customer in the overall body with a three-dimensional body figure mesurement device to obtain coordinate values; subjecting the coordinate values to computer graphics to display resulting customer's nude data including two- and three-dimensional figures and dimensions of predetermined body parts on a computer display unit; conducting simulation by collating the nude data thus displayed with the desired wearing data called and retrieved from the memory to conduct corrective operation so as to give

a desired, well-proportioned figure to the body when an intended foundation garment is worn by the customer, while displaying resulting compensated wearing data of the customer together with the nude data on the same display scope; and making the intended foundation garment on the basis of the customer's compensated wearing data.

The invention also provides a further automated method, which comprises inputting the compensated wearing data above and corrections based on a tension degree the customer likes and on elongation data and elongation recovery of a cloth covering mainly the torso into a computer software memorizing paper pattern data of any foundation garment to obtain automatically paper pattern data of the customer; either outputting and plotting the pattern data with a plotter, and cutting out a set of parts or pieces, or inputting the paper pattern data into a computer-controlled automatic cutting machine to cut out a set of parts; and then sewing the set of parts into the intended foundation garment.

Here, the three-dimensional body figure measurement unit to be used is of a non-touch type of one capable of simultaneously measuring the whole body of a customer or wearer in terms of coordinate values and girth sizes, and preferably includes, for example, a unit disclosed in Japanese Patent Publication No. 64-34329 (1989)A, a unit disclosed in Japanese Patent Publication No. 1-121707(1989) A, etc.

The present method of making a foundation garment is

thus characterized by taking advantage of such compensated data of a customer that will provide a well-proportioned wearing state when the customer-tailored foundation garment is worn. That is, the nude data including two- and three-dimensional figures and dimensions of predetermined body parts of the customer or wearer thus obtained with the aid of a three-dimensional measurement unit are displayed on a computer display unit and collated comparatively with corresponding desired wearing data from the memory to conduct corrective operation, thus providing compensated wearing data giving a desired well-proportioned figure when worn by the customer, the compensated wearing data similarly including two- and three-dimensional figures and dimensions of predetermined body parts.

Stated another way, visual simulation of the customer's nude data above is conducted on the basis of the desired wearing data from the memory, while displaying the resulting compensated wearing data providing a well-proportioned figure and the nude data on the same display scope.

Size data of an ideal wearing body for the customer are thus obtained and accordingly, it is possible to obtain paper pattern data based on the size data and to make an intended foundation garment imparting an aesthetic wearing figure when worn.

BRIEF DESCRIPTION OF THE DRAWINGS:

Now, examples of the invention will be hereinbelow described in more detail with reference to the accompanying

drawings, in which:

Fig. 1 is one example of a flow chart showing steps of a custom-tailoring method relating to this invention;

Fig. 2 is an illustration showing one example of a display scope, in which customer's nude data, i.e., two-dimensional figures in front and side views, three-dimensional figure, whose angle is changeable by 360° longitudinally and laterrally, and dimensional data of body parts after measurement step are illustrated;

Fig. 3 is a partial illustration showing one example of a display scope at a simulation step, in which compensated wearing data, i.e. two-dimensional figures (front and side views), a three-dimensional figure rotatable by any angle laterally and longitudinally and dimensional data of body parts are illustrated, with the nude data as in Fig. 2 omitted; and

Fig. 4 is a schematic perspective view showing one example of a three-dimensional body figure measurement device used for the measurement step of the present method.

DESCRIPTION OF THE PREFERRED EMBODIMENTS:

According to this invention, a foundation garment is made to order in accordance with the steps illustrated in Fig. 1, starting from the 3-D measurement step of a customer or wearer.

Preparatory to the measurement step, dimensional data corresponding to a variety of body figure types are preliminarily collected from a multitude of persons and

stored in a computer memory. That is, nude data including 2-D and 3-D figures and dimensions of predetermined body parts of each of the persons and desired wearing data, corresponding to the nude data, giving a well-proportioned, fitted wearing figure are prepared and memorized in the memory. The desired wearing data for the memory are prepared by correcting the real wearing data, obtained when an individual standardized size of a foundation garment (e.g. ready-made one) chosen from many standardized sizes is worn by the persons, so as to give well-proportioned wearing figure, taking account of the overall proportion.

When an order is received from a customer to make a foundation garment most suited to herself or himself, dimensions of the customer or wearer in overall body are first measured with the aid of a 3-D figure measurement device. For this measurement, known measurement devices as well as those mentioned above can be used, but one example of the device is shown in Fig. 4.

The measurement device comprises a distance-measuring ring 2 disposed in a XY plane perpendicular to a Z-axis of a 3-D coordinate system, a plurality of detection heads 1 including a light source and a semiconductor position transducer (both not shown) and attached to the inner face of the distance-measuring ring 2 in a manner that distances from the heads to the Z-axis are virtually the same, guide rods 3 for guiding the ring 2 in the Z-axis direction, a drive mechanism (not shown) for moving the ring 2 along the guide

rods 3, and a measurement means (not shown) for measuring the three-dimensional configuration of a customer or wearer M who is taken sizes.

The detection heads 1 inside the distance-measuring ring 2 output detection signals corresponding to distances from there to the customer M, while moving along the guide rods 3 together with the ring 2. Consequently, detection signals conforming to the three-dimensional configuration of the customer M are obtained, and as a result, the three-dimensional figure of the customer M is obtained as X, Y, Z coordinate values.

The X, Y, Z coordinate values thus obtained are input and subjected to computer graphics, and as shown in Fig. 2, nude data A, including a front figure and a side figure in a fixed state, a 3-D figure changeable in every angle (longitudinal rotation of 15° and lateral rotation of 60° in the illustrated example) and dimensional values of predetermined body parts, are then displayed on a visual display unit.

These nude data so displayed are automatically simulated by collation with the memory data preliminarily stored in the computer, which comprises a multitude of desired, well-proportioned wearing data and nude data, and by corrective operation to result in compensated wearing data B giving a desired,well-proportioned figure to the body. The computer graphics simulation processing is performed by taking account of close or closest data of the memory and

fleshy constitution of the customer.

The compensated wearing data B thus simulated include likewise, as shown in Fig. 3, two-dimensional figures, a 3-D figure changeable in angle by 360° laterally and longitudinally,and dimensions of predetermined body parts, with the nude data A and the compensated wearing data B arranged on the same display scope in the top and bottom portions thereof.

In Figs. 2 and 3, the 3-D figure is party shown in the range between the upper and lower dotted lines, but, of course, can be displayed over the whole body.

Thus, basic size data necessary for the making of a customer's foundation garment are available, and subsequently, it is possible to cut out its parts or pieces and sew them into a foundation garment product as intended, which is suited to the customer or wearer and imparts an aesthetic desired wearing figure when worn.

More specifically stated, the compensated wearing data B can be input into a computer software memorizing paper pattern data of foundation garments to prepare customer's own paper pattern data, which are output and plotted with a plotter to paper patterns, on the basis of which it is possible to cut out parts for a foundation garment. Alternatively, the paper pattern data can be input into a computer-controlled cutting machine known per se, with which to cut out the parts. A set of parts thus cut out is then transferred to a sewing step and finally made into a foundation garment product.

The paper pattern data, when stored in a floppy disk, has an enlarged scope of uses. In particular, when a sewing workshop is located at a distant place, the floppy disk can be forwarded to it and an intended foundation garment can be similary made.

The foundation garment thus custom-tailored is not only fitted to the customer's own body, but also enables to give an ideal, well-proportioned wearing figure when worn, thus enhancing a body compensation effect.

The invention, thus far described, makes a contrast to the prior art custom-making method, wherein limited sizes of a wearer are taken and compared with a standared size model of undergarment and its pattern points are only partially displaced and corrected to be suited to the body of the wearer.

According to this invention, however, the overall body figure of a customer is measured three-dimensionally, and the resulting size data are corrected by simulation processing by collation with the memory data so as to give a most fashionalble, well-proportioned wearing figure. Consequently, the foundation garment made on the basis of the resulting compensated wearing data provides not only an aesthetic, well-proportioned figure, but a comfortable feeling without unnatural tightness. It is also advantageous that the paper pattern data obtained from the compensated wearing data can be used repeatedly and in a distant place in the form of a floppy disk.



What is claimed is:

1. A method of custom-tailoring a foundation garment suited to a customer's body, which comprises :

preliminarily preparing desired wearing data, including two- and three-dimensional figures and dimensions of pre-determined body parts, collected from a multitude of persons in all types of body figures, compensated so as to give a fitted and well-proportioned figure to the body when a standardized size of a foundation garment is worn by said persons, respectively and storing and memorizing the desired wearing data in a computer memory;

measuring dimensions of a customer in the whole body with a three-dimensional body figure measurement device and subjecting resulting three-dimensional coordinate values to computer graphics thereby to display customer's nude data including two- and three-dimensional figures and dimensions of predetermined body parts on a computer display unit;

conducting visual simulation processing by collating the nude data with the desired wearing data called from the memory and conducting corrective operation, while displaying resulting customer's compensated wearing data, including two- and three-dimensional figures and dimensions of predetermined body parts, compensated so as to give a desired, well-proportioned figure to the body when a foundation garment as intended is worn by the customer;

and making the foundation garment on the basis of the customer's compensated wearing data.

2. A method of custom-tailoring a foundation garment suited to a customer's body, which comprises :

preliminarily preparing desired wearing data, including two- and three-dimensional figures and dimensions of pre-determined body parts, collected from a multitude of persons in all types of body figures and compensated to give a fitted and well-proportioned figure to the body when a standardized size of a foundation garment is worn by said persons, respectively and storing and memorizing the desired wearing data in a computer memory;

measuring dimensions of a customer in the whole body with a three-dimensional body figure measurement device and subjecting resulting three-dimensional coordinate values to computer graphics thereby to display customer's nude data including two- and three-dimensional figures and dimensions of predetermined body parts on a computer display unit;

conducting visual simulation processing by collation of the customer's nude data with the desired wearing data called from the memory and by corrective operation, while displaying resulting customer's compensated wearing data, including two- and three-dimensional figures and dimensions of predetermined body parts, capable of giving a desired, well-proportioned figure to the body when an intended foundation garment is worn by the customer;

taking sizes necessary for the foundation garment from the customer's compensated wearing data thus displayed and inputting the sizes in a computer memorizing paper pattern

data for the garment to obtain paper pattern data;
outputting and plotting the paper pattern data with a plotter to paper patterns;
cutting out a set of garment parts on the basis of the paper patterns; and
subsequently sewing the garment parts into the foundation garment as intended.

3. A method of custom-tailoring a foundation garment suited to a customer's body, which comprises :
preliminarily preparing desired wearing data, including two- and three-dimensional figures and dimensions of pre-determined body parts, collected from a multitude of persons in all types of body figures and compensated to give a fitted and well-proportioned figure to the body when a standardized size of a foundation garment is worn by said persons, respectively and storing and memorizing the desired wearing data in a computer memory;
measuring dimensions of a customer in the whole body with a three-dimensional body figure measurement device and subjecting resulting three-dimensional coordinate values to computer graphics thereby to display customer's nude data including two- and three-dimensional figures and dimensions of predetermined body parts on a computer display unit;
conducting visual simulation processing by collation of the nude data with the desired wearing data called from the memory and by corrective operation, while displaying resulting customer's compensated wearing data, including 2-

and 3-dimensional figures and dimensions of predeteremined body parts, capable of giving a desired, well-proportioned figure to the body when an intended foundation garment is worn by the customer;

taking sizes necessary for the foundation garment from the customer's compensated wearing data thus displayed and inputting the sizes in a computer memorizing paper pattern data for the garment to obtain customer's paper pattern data;

inputting the paper pattern data into an automatic computer-controlled cutting machine to cut out foundation garment parts; and

subsequently sewing the parts into the foundation garment as intended.