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(54) Crumpling process

(57) A method of pleating a garment, wherein an unfinished garment, generally prepared by sewing cut material together, is pleated in a particular direction in a random or pseudo-random manner to produce a set of non-continuous pleats that include pleated and non-pleated portions of random length. The garment optionally may be pleated again, but in a different direction (e.g., in a direction perpendicular to the first set of pleats), to produce continuous or, alternatively, non-continuous pleats, wherein the second set of non-continuous pleats also includes pleated and non-pleated portions of random length.

FIG. 3A

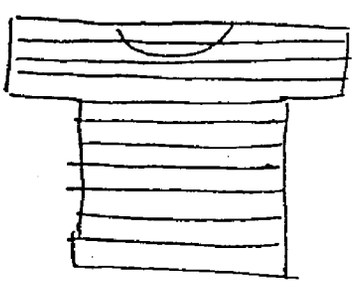
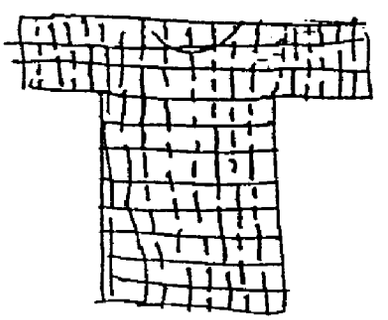


FIG. 3B



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a "crunch process" which is a method of randomly pleating garments to produce pleated garments, such as pleated blouses, pleated skirts, pleated dresses, pleated slacks, etc., having a "crunched up" appearance.

[0002] Methods of manufacturing pleated garments such as pleated blouses are known, and processes of forming pleats on skirts, dresses, blouses, slacks, and the like are generally called "pleating." When pleated, garments take on a particular visual effect and provide a specific aesthetic impression The pleats further impart garment flexibility, which makes the wearer feel comfortable, even if the normal size of the garment is too small for the wearer.

[0003] The pleated garment, such as pleated skirts, pleated dresses, pleated blouses and pleated slacks, are usually manufactured in the following steps:

1) cloth is cut into several parts having predetermined shapes and sizes;
2) the parts are pressed in preparation for the next step;
3) the parts are pleated by a pleating machine between two pieces of paper or by human labor;
4) the pleated parts are heat treated (i.e., baked) so as to fix the pleats, and
5) the resultant parts are sewn together to produce the finished product.

[0004] Currently, pleats come in various designs and patterns. For example, there are simple pleats, and complex pleats, such as tapered-side pleats, accordion pleats, pattern-matching pleats, and so on. To date, however, most pleated garments, while producing a particular aesthetic impression, have pleat patterns that are monotonous and, thus, uninteresting.

OBJECTS AND SUMMARY OF THE INVENTION

[0005] Therefore, it is an object of the present invention to provide a crunch process of pleating unfinished garments in various particular manners to produce pleated garments having an interesting and aesthetically pleasing appearance.

[0006] Another object of the present invention is to provide a method of pleating unfinished garments to produce pleated garments having a crunched-up look.

[0007] To achieve these objects, as well as other objects, advantages and features, a crunch process in accordance with one embodiment of the present invention is achieved by forming in a first direction a first set of pleats in an unfinished garment, and forming, either before or after the first set of pleats is formed, a set of non-continuous pleats in a random or pseudo-random manner in a second direction of the garment.

[0008] As one aspect of the present invention, both sets of pleats are formed in a random manner so that they are both comprised of non-continuous pleats.

[0009] As another aspect, the two sets of formed pleats are perpendicular to one another. Alternatively, the two sets of formed pleats are not perpendicular to one another.

[0010] As a further aspect, each set of pleats is comprised of a plurality of adjacent pleats, and each set of non-continuous pleats is comprised of a plurality of random, non-continuous, adjacent pleats.

[0011] As an additional aspect of the invention, each non-continuous pleat includes pleated parts and non-pleated parts, and each of the pleated parts is random or pseudo-random in length.

[0012] In accordance with another embodiment of the present invention, the crunch process is achieved by cutting material to produce parts of at least one shape and size, sewing the parts together to produce an unfinished garment, and forming in the unfinished garment a non-continuous pleat that extends across the garment and that includes pleated portions and non-pleated portions.

[0013] As an aspect of this embodiment, each of the pleated portions and/or non-pleated portions of the non-continuous pleat is random or pseudo-random in length.

[0014] As a further aspect of this embodiment, a second non-continuous pleat is formed in the unfinished garment in a different direction as that of the first pleat, and the second non-continuous pleat includes pleated portions and non-pleated portions.

[0015] In accordance with a further embodiment of the present invention, a pleated garment is comprised of sewn parts of at least one predetermined shape and size, wherein the sewn parts includes a plurality of adjacent, non-continuous pleats that extends in a first direction across the sewn parts, each of the non-continuous pleats including pleated portions and non-pleated portions of random or pseudo-random lend ad a second plurality of adjacent pleats that extends across the sewn parts in a second direction different from the first direction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The following detailed description, given by way of example and not intended to limit the present invention solely thereto, will best be appreciated in conjunction with the accompanying drawings, wherein like reference numerals denote like elements and parts, in which:

[0017] Fig. 1 is a flow chart illustrating the crunch process of the present invention;

[0018] Figs. 2A and 2B are schematic illustrations of the parts of a blouse and Fig. 2C is a schematic illustration of a sewn blouse for purposes of the explanation of the crunch process of the present invention;

[0019] Figs. 3A and 3B are schematic illustrations of a blouse having pleats thereon during different stages of the process of the present invention;

[0020] Fig. 4 is a black and white photocopy of a picture of a portion of a blouse pleated in accordance with the present invention;

[0021] Figs. 5A and 5B represent different pleat patterns that may be produced in accordance with the present invention;

[0022] Fig. 6 is a further pleat pattern that may be produced in accordance with the present invention;

[0023] Figs. 7A - 7C illustrate additional various directions of pleats that are formed by the process of the present invention; and

[0024] Figs. 8A and 8B schematically illustrate yet other types of pleat patterns that may be formed in accordance with the present invention.

DETAILED DESCRIPTION OF CERTAIN PREFERRED EMBODIMENTS

[0025] Referring now to the drawings, FIG. 1 is a flow chart of the basic steps of the crunch process of the present invention. As shown, selected cloth is cut into several parts having various shapes and sizes (step 10). For example, to manufacture a pleated blouse in accordance with the present invention, cloth, or other material, is cut to produce a front part 30 and a back part 32, such as shown in FIGS. 2A and 2B. Other parts of the blouse, such as a pocket, also may be cut. The cut parts are sewn together (in step 12) in any manner known, for example, by use of a sewing machine, to produce the unfinished blouse 34, as shown in FIG. 2C. The unfinished blouse is pleated between two pieces of paper a first time in step 14 and pleated again a second time in step 16 to produce the finished garment. The process of pleating an unfinished garment in accordance with the present invention, (i.e., steps 14 and 16) is discussed in detail below. It is understood that since the processes of cutting and sewing parts together are well known in the art, further description thereof is omitted herein.

[0026] In accordance with the present invention, the sewn (unfinished) garment is fed through a pleating device (step 14 of FIG. 1) which imparts a series of parallel folds or pleats in the fabric extending across the width of the fabric. FIG 3A is a schematic illustration of the garment having horizontal pleats therein, and it is seen that the horizontal pleats extend along the entire width of the garment. This first pleating step may be carried out by any known means. The pleated garment then, and in accordance with the present invention, is fed vertically (i.e., in the direction perpendicular to the direction in which the garment previously was fed) through a pleating device, such pleating device being either the same pleating device that made the first set of pleats (but adjusted, as will be understood) or a different pleating device. This time, though, the pleating device imparts a series of non-continuous parallel folds (pleats) in the fabric extending across the length of the fabric. The non-continuous pleats include pleated portions and non-pleated portions, ad it can be said that such pleats, while not continuous, extend along the entire length (from top to bottom) of the garment. In addition, such non-continuous pleating is accomplished in a random or pseudo-random manner in which the vertical pleats appear to be randomly formed, such as schematically shown in FIG. 3B.

[0027] Ordinarily, during standard pleating, a pleating device, usually by means of adjacent, and usually equidistantly spaced, pleating rods (or slats or equivalent thereof), forms a series of parallel, uniform pleats, such pleats being formed as the garment is fed through the device. In accordance with the present invention, however, each pleat (of the series of pleats) is formed for a particular distance (or length of time, during the process), and then the respective pleat is not formed for a particular length of the garment (or time), then a pleat is formed for a particular length of garment thereafter, and then not formed, and so on. The length of material of each pleated part is randomly determined and the length of each non-pleated part thereof also is randomly determined (to be further discussed).

[0028] Upon completion of forming the vertical non-continuous pleats, the garment is finished. FIG. 4 is a black and white photograph of a portion of a pleated blouse that was pleated in accordance with the crunch process of the present invention.

[0029] As previously discussed, each pleated portion and each non-pleated portion of each vertical, non-continuous pleat is random in length. Such random length may be determined by, for example, a computer system (or microcontroller, etc.) that is attached to the pleating device, wherein the computer (by means of appropriate software) randomly selects the length of each pleated and non-pleated section of each vertical pleat and, thereafter, controls the pleating device to pleat or not pleat the garment accordingly. Actually, since a multiple number of adjacent, non-continuous, vertical pleats are formed simultaneously in the garment, selected pleating members are controlled to pleat the fabric while other pleating members are controlled to not pleat the fabric at each given instance in time.

[0030] The pleating process of the present invention also may produce vertical, non-continuous pleats that are comprised of pleated sections and non-pleated sections of pseudo-random length. Such may be provided by, for example, a non-intelligent mechanical device such as a "keyed" rotating wheel or roller which has a number of tracks thereon, each track corresponding to a respective vertical, non-continuous pleat to be formed. As the wheel rotates, indentations, pins, recessed portions, etc. on each track provide the pseudo-random length of the pleated and non-pleated portions of the respective non-continuous pleat. But this construction is merely one example of how pleated and non-pleated

portions are established to have pseudo-random lengths. Therefore, it should be understood that the exact nature of the pleating device used in carrying out the invention disclosed herein is not important so long as the device or method used produces random or random-like pleats in the fabric.

[0031] FIGS. 5A and 5B disclose alternative pleat patterns that may be formed by the process of the present invention. FIG. 5A discloses a pleat pattern having continuous horizontal pleats and non-continuous, vertical pleats, wherein each vertical pleat includes pleated portions of the same random length, and non-pleated portions of the same random length. That is, the lengths of the pleated and non-pleated portions are the same throughout a given vertical pleat, but are different with respect to lengths of the pleated and non-pleated parts of the other (e.g., adjacent) vertical pleats. FIG. 5B, on the other hand, discloses a pleat pattern with horizontal pleats and non-continuous vertical pleats, wherein each of the pleated portions and non-pleated portions of a given vertical pleat is of random length, and the lengths of the pleated and non-pleated portions of all of the other vertical pleats are of the same length as the corresponding pleated and non-pleated portions in said given vertical pleat. In addition, in either of these cases, as well as the embodiment discussed above (see FIG 3B), the process of the present invention may provide for the random selection of the pleated portions only, thus providing non-pleated portions of each non-continuous pleat to be of pre-determined length.

[0032] In accordance with another embodiment of the present invention, the horizontal pleats are non-continuous and randomly or "pseudo randomly" formed, while the vertical pleats are "standard" and continuous throughout the length of the garment. This variation of the above discussed process is performed by rotating the garment 90 degrees with respect to the direction of the pleats, as previously discussed.

[0033] In accordance with a third embodiment of the present invention, the crunch process provides for the random pleating of the garment in both the vertical and horizontal directions. As shown in FIG. 6, each horizontal pleat includes pleated and non-pleated portions of random length and, similarly, each vertical pleat includes pleated and non-pleated portions of random length. In this instance, the vertical and horizontal pleats may be formed in an identical manner, wherein after the garment is pleated a first time, the garment is rotated 90 degrees upon feeding it through the pleating device to form the other set of non-continuous pleats. Also, like the embodiments discussed above, the lengths of the pleated and non-pleated portions of a given vertical or horizontal pleat may be different, or the same, in length, and/or correspond to lengths of pleated and non-pleated portions of other pleats (see, for example, FIGS. 3B, 5A and 5B).

[0034] Each of the embodiments discussed above discloses a crunch process which forms horizontal and vertical pleats in a garment. However, the present invention is not limited to pleat patterns with both horizontal and vertical pleats and may provide a pleated garment having only one set of pleats, either in the horizontal or vertical direction, or in another direction, and this one set of pleats includes adjacent pleats with pleated portions and non-pleated portions of random length.

[0035] In accordance with a further embodiment of the present invention, the two sets of pleats are not perpendicular to one another, such as shown in FIGS. 7A and 7B (non-continuous aspect not shown). One set of pleats (either continuous or non-continuous) is either a horizontal pleat (FIG. 7A) or a vertical pleat (FIG. 7B), and the other set of pleats is neither a vertical nor horizontal pleat, but instead is formed in some other direction. Such pleats may be formed at a 45 degree angle with respect to the first pleat (as shown), or at any other desired angle (e.g., 20 degrees, 30 degrees, 60 degrees, etc.). Further, one or both of these sets of pleats may be non-continuous pleats. Still further, FIG. 7C illustrates a further variation of this embodiment wherein neither set is a vertical or horizontal pleat. Thus, the process of the present invention provides for the formation of sets of pleats that are in any direction of the garment.

[0036] While various embodiments of the present invention have been discussed, it should be appreciated that various cages may be made without departing from the spirit and scope of the invention. For example, while both the continuous and non-continuous pleats are shown as being comprised of relatively straight, adjacently aligned pleats, the present invention is not limited to such design and may generate non-continuous curved pleats (see, e.g., FIG. 8A), non-continuous skewed pleats (see, e.g., FIG. 8B), or non-continuous versions of any other type of pleat that is known in the art.

[0037] As another example, although the present discussion is directed to the formation of one or two sets of pleats in a garment, the present invention is not limited solely thereto and may be widely applied to the formation of three or more sets of pleats in a garment, wherein at least one of those pleats is formed in a non-continuous, random manner.

[0038] As a further example, although several of the disclosed embodiments provide that the formation of non-continuous pleats occurs after the formation of the continuous pleats, it is appreciated that this order may be reversed.

[0039] Therefore, it is intended that the appended claims be interpreted as including the embodiments described herein, the alternatives mentioned above, and all equivalents thereto.

Claims

1. A method of pleating a garment, comprising the

steps of:

forming a first set of pleats in a garment in a first direction; and

forming a second set of pleats in said garment in a second direction, wherein at least one of said first and second forming steps is carried in a random or pseudo-random manner to produce non-continuous pleats in the respective direction.

2. The method of claim 1, wherein both of said first and second forming steps are carried out in said random or pseudo-random manner such that both said first and second sets of pleats are comprised of non-continuous pleats in the respective directions.

3. The method of claim 1, wherein said first direction is perpendicular to said second direction.

4. The method of claim 1, wherein said first direction is not perpendicular to said second direction, and said first and second directions are different.

5. The method of claim 1, wherein each of said first and second sets of pleats is comprised of a plurality of adjacent pleats.

6. The method of claim 1, wherein said at least one of said first and second forming steps that is carried in said random or pseudo-random manner produces a plurality of random, non-continuous, adjacent pleats.

7. The method of claim 1, wherein each of said non-continuous pleats includes a plurality of pleated parts and non-pleated parts, each of said pleated parts being of random or pseudo-random length.

8. The method of claim 7, wherein each of said non-continuous pleats extends across an entire length of said garment.

9. A method of pleating a garment, comprising the steps of:

cutting material to produce parts of at least one shape and size;
sewing the parts together to produce an unfinished garment; and
forming a non-continuous pleat in said unfinished garment, said non-continuous pleat extending across said garment and including pleated portions and non-pleated portions.

10. The method of claim 9, wherein each of said pleated portions of said non-continuous pleat is random or pseudo-random in length.

11. The method of claim 11, wherein each of said non-pleated portions of said non-continuous pleat is random or pseudo-random in length.

12. The method of claim 9, further comprising the step of forming a second non-continuous pleat in said unfinished garment, said second non-continuous pleat extending across said garment in a direction different from a direction of the first non-continuous pleat formed by the first forming step, said second non-continuous pleat including pleated portions and non-pleated portions.

13. The method of claim 12, wherein each of said pleated portions of each of said first and second non-continuous pleats is random or pseudo-random in length.

14. The method of claim 12, wherein each of said forming steps is came out by forming a plurality of adjacent, non-continuous pleats in the respective direction of the unfinished garment.

15. The method of claim 9, further comprising the step of forming a second pleat in said unfinished garment in a direction perpendicular to a direction of the non-continuous pleat formed by the first forming step.

16. The method of claim 15, wherein said second pleat is a continuous pleat extending across said garment.

17. The method of claim 15, wherein said second pleat is a non-continuous pleat extending across said garment.

18. The method of claim 9, wherein said non-continuous pleat includes a plurality of adjacently aligned non-continuous pleats, each of said adjacently aligned non-continuous pleats including a plurality of pleated portions and non-pleated portions of random or pseudo-random length.

19. A pleated garment, comprising:

sewn parts of at least one predetermined shape and size;
a plurality of adjacent, non-continuous pleats in said sewn parts and extending in a first direction across said sewn parts, each of said non-continuous pleats including pleated portions and non-pleated portions of random or pseudo-random length; and
a second plurality of adjacent pleats in said

sewn parts and extending across said sewn parts in a second direction different from said first direction.

20. The pleated garment of claim 19, wherein said first and second directions are perpendicular to one another.

Fig. 1

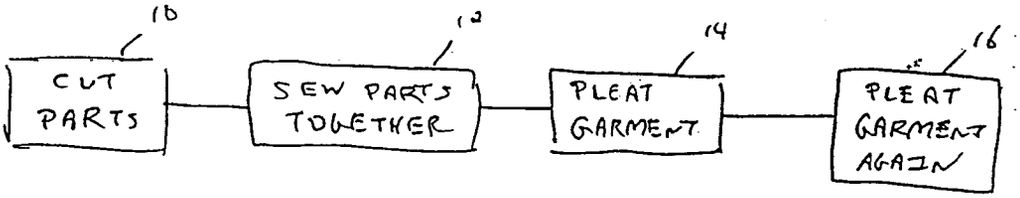


FIG. 2A

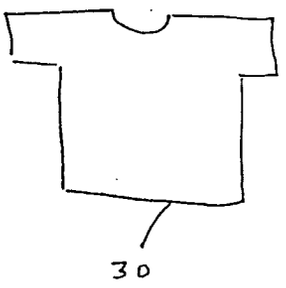


FIG. 2B

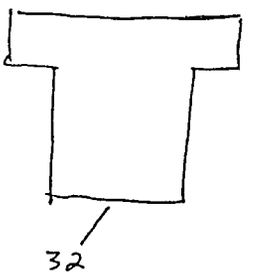


FIG. 2C

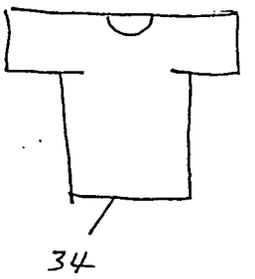


FIG. 3A

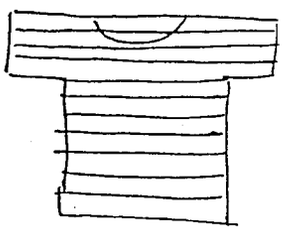


FIG. 3B

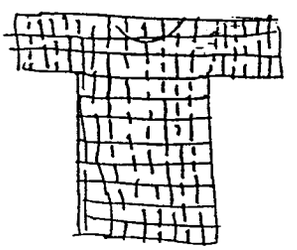


FIG. 4

FIG. 5A

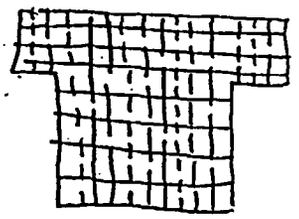


FIG. 5B

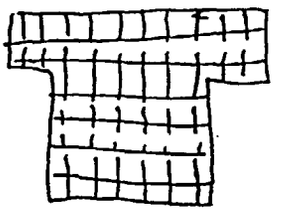


FIG. 6

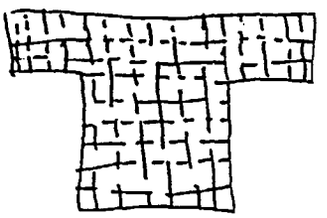


FIG. 7A

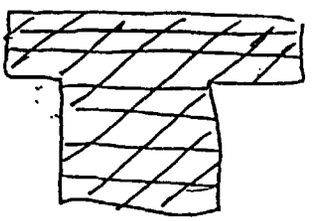


FIG. 7B

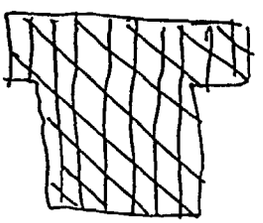


FIG. 7C

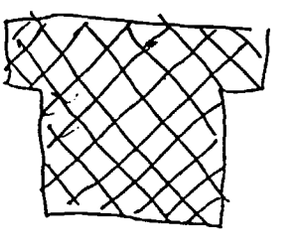


FIG. 8A

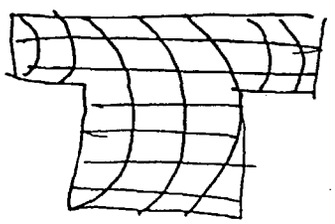
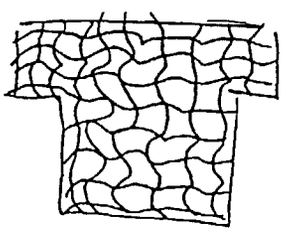


FIG. 8B



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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 2731

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 529 766 A (K.K. MIYAKE DESIGN JIMUSHO D/B/A MIYAKE DESIGN STUDIO) 3 March 1993 * column 10, line 5 - line 24; claims 1-5; figures *	1,4-6,9, 19	D06J1/12
A	DE 31 18 380 A (K. KLEBER) 25 November 1982	1,19	
X	* page 6, line 4 - line 12; claims 1-3; figures *	9-11	
A	PATENT ABSTRACTS OF JAPAN vol. 096, no. 005, 31 May 1996 -& JP 08 003864 A (MOCHIDA SHOKO KK), 9 January 1996 * abstract *		
A	PATENT ABSTRACTS OF JAPAN vol. 015, no. 034 (C-0799), 28 January 1991 -& JP 02 269866 A (MIYAKE DESIGN JIMUSHO:KK), 5 November 1990 * abstract *		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 018, no. 647 (C-1283), 8 December 1994 -& JP 06 248571 A (MIYAKE DESIGN JIMUSHO:KK), 6 September 1994 * abstract *		D06J A41D B31F D06C
A	US 3 823 452 A (L.B. HARROW) 16 July 1974		
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 December 1998	D'Hulster, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 10 2731

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22-12-1998

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