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(54) **Elastic fabric**

(57) An elastic fabric, of the type comprising a warp knit fabric with synthetic fiber and elastomer fiber yarns, the yarn (1) of the weft of first bar of the machine being formed by an elastomer and the yarn (2) of the warp or second bar of the machine is formed by a synthetic fiber, the fabric comprising the yarn (1) with a 3-1-1/0-2-2// weave and the yarn (2) with a 1-2-1/1-0-1// weave, the yarning for both yarns (1 and 2) being all full, where the weave between the yarns (1 and 2) of the fabric forms parallel and resistant four-yarn strands (3) by means of consecutive loops in a longitudinal direction of said fabric, these strands (3) being configured by the two parallel yarns and the turn thereof, the yarns (1 and 2) being alternately arranged coming out of the loop in a transverse and diagonal direction with respect to said strands (3) of loops, thus forming a hybrid mesh of extensible and resistant yarns with improved tension and which does not roll up when it is subjected to traction.

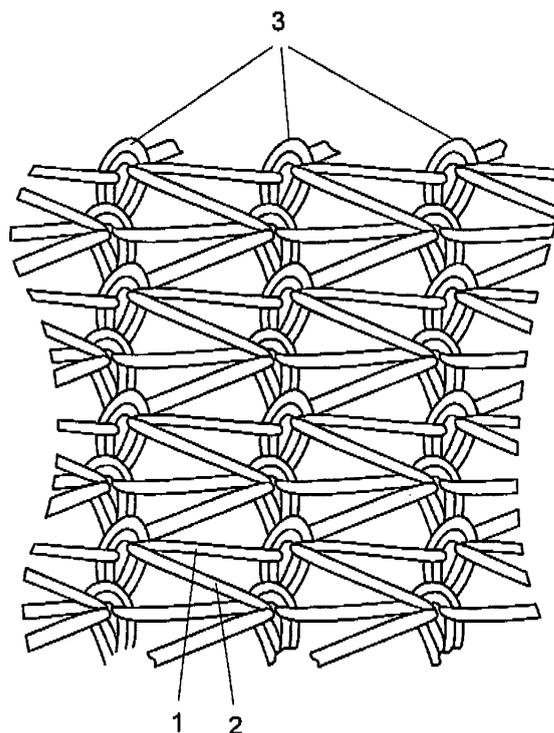


Fig. 1

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DescriptionObject of the Invention

[0001] The present invention relates to a warp knit fabric with synthetic fiber and elastomeric yarns.

Background of the Invention

[0002] The use of fabrics incorporating mixtures of natural or synthetic fibers with elastomers currently allows manufacturing elastic garments with a great adaptability to the human body, such as underwear garments, sportswear or simply garments that are very comfortable to wear.

[0003] These elastic fabrics must provide different qualities such that they allow an ease in manufacturing the garments and subsequently a better maintenance. The fabrics are preferably made by means of warp knitting to achieve a greater elasticity.

[0004] Garments incorporating synthetic fibers thus allow laser cutting and ultrasound welding, thus preventing uncomfortable seams. However, these garments have a certain tendency to roll up at their selvages or edges, such that the movement of the user's body forms cords or small rolls causing certain discomfort.

[0005] The garments made with mixtures of natural fibers and elastomers do not have a correct lightness finish and have problems of adaptability to the body compared to previous fabrics of synthetic fibers as they are looser.

[0006] An example of elastic fabric which is more suitably adapted to the configuration of the body is that described in Spanish utility model U200601425, and which describes a fabric in which the yarn of the weft is formed by an elastomer and the yarn of the warp is formed by a synthetic fiber. The fabric comprises the elastomeric yarn with a 3-1-1/0-2-2// weave on the reed closest to the needles or first reed of a warp knitting machine, whereas in the second reed the synthetic fiber is arranged with a 1-2-1/1-0-1// weave, the yarning or weaving for both yarns being of the all full type. The synthetic fiber yarn is thus on one face of the fabric, making a certain plating, and the elastomeric yarn is on the other face of the fabric, such that said construction prevents said fabric from being able to roll up when it is tensed or stretched on the user's skin.

[0007] The problem of this type of fabric is that the extension of the use of these fabrics to other sectors in which they are still not used is mainly hindered by technical or hygienic problems. For example, in the swimming sector, fabrics incorporating elastomeric yarns, especially elastane yarns, have a life that is three times shorter, since the chlorine of swimming pools attacks said elastane, destroying it in a short time. Another sector in which it has not been possible to use said fabrics up until now is in the sector of bandages and products for wound recovery, since these fabrics must have a considerable resistance to the pharmacological products with which they

can come into contact and must not accumulate bacteria and odors due to the prolonged use made.

Description of the Invention

[0008] The elastic fabric of this invention has technical particularities making it especially suitable for manufacturing underwear garments, sportswear, garments that are comfortable to wear, swimwear, technical garments for their use in medical treatments and generally all those garments fitting tightly on the human body.

[0009] According to the invention, the weave of the fabric forms parallel and resistant four-yarn strands by means of consecutive loops in a longitudinal direction of the fabric, these strands being configured by the two parallel yarns and the turn thereof. These weaves also allow the elastane yarns and the synthetic fiber yarns to change in each loop the exit direction with respect to the entrance direction in the transverse direction, thus forming a hybrid mesh of extensible and resistant yarns with an improved tension. These changes of direction of the fibers in the loops allow arranging the yarns from a horizontal entrance direction to a diagonal entrance direction and vice versa, both in upward diagonals and in downward diagonals with respect to the formation direction of the loops. This arrangement provides that the stress distribution in the diagonal direction is also benefited since the fabric has elastane yarns and synthetic fiber yarns also aligned in both diagonal directions.

[0010] Thus, to prevent chlorine attack problems during the use of garments made with this fabric it has been provided that the yarn of the weft is of a chlorine-resistant elastomer, for example, by means of a neutralization agent.

[0011] The fabric can optionally also comprise a silver salt coating on the fabric, with antibacterial and odor elimination functions, being adapted to the final needs and standards to be complied with or final use.

[0012] The fabric thus allows a more prolonged use in contact with the user's skin and can be used as swimwear, since its durability is increased but also since it does not allow the proliferation of bacteria and microorganisms responsible for body odor and of the garments as they are constantly wet.

[0013] Since the use of the fabric in intimate contact garments such as lingerie or underwear has been provided, the synthetic fiber yarn can comprise embedded therein microcapsules of delayed-release substances, such as aloe vera, anti-dust mite substances, anti-static substances and/or moisturizing substances. The garment made with this fabric thus also has cosmetic properties or anti-allergic advantages making it more comfortable to wear, according to its final use.

[0014] In a possible embodiment, the fabric comprises added silver yarns, carbon fiber yarns and/or yarns of other materials incorporated among the synthetic yarns to confer antibacterial, static electricity conducting or heat insulating properties, according to its final use. This al-

lows defining the fabric as a technical fabric for professional uses where the garments must comply with functions apart from high comfort, or for its use in very demanding sports, in which the fabrics of the garments play a very important factor. These added yarns can substitute part of the yarns of the second bar, without the elasticity of the fabric being reduced due to this.

[0015] The fabric comprises between 30% and 70% by weight of synthetic fiber yarn, although the percentage by weight is preferably 60% of the total.

[0016] The fabric in turn comprises between 30% and 70% by weight of elastomeric yarn, although the percentage by weight is preferably 40% of the total.

[0017] Said elastomer is mainly an elastane, such as Lycra® or other trademarks such as Creora®, Roica®, etc, which allow a high longitudinal and transverse elasticity. The yarn used is an elastane fiber between 11 and 210 deniers.

[0018] The synthetic fiber yarn used is preferably a polyamide fiber, such as polyamide PA6, PA66, PES or other synthetic fibers which can range from 11 to 210 deniers, with monofilament to multifilament and microfibrer yarns. This synthetic fiber together with elastane allows the fabric to be handled with the most modern technologies, allowing the laser cutting of the fabric and its welding by means of ultrasound, thus allowing making multi-piece garments without conventional seams, which lead to a loss of elasticity and comfort of the piece or garment that do not occur in a garment the parts of which are joined by welding.

Description of the Drawings

[0019] To complement the description which is being made and with the aim of aiding to better understand the features of the invention, a set of drawings is attached to the present specification in which the following has been depicted with an illustrative and non-limiting character:

- Figure 1 shows an enlarged image of the fabric resulting from the use of these weaves.
- Figure 2 shows a depiction of the layout of the synthetic fiber yarn of the mesh fabric.
- Figure 3 shows a depiction of the layout of the elastomer fiber yarn of the mesh fabric.
- Figure 4 shows a depiction of the layout of the knit of the complete mesh fabric.

Preferred Embodiment of the Invention

[0020] As can be observed in the referenced figures, the fabric is formed by a warp knit with an elastane yarn (1) and a polyamide type synthetic fiber yarn (2), a microfibrer yarn in this case.

[0021] Figure 1 shows how the yarns (1 and 2) are woven in a series of consecutive loops in a longitudinal direction, forming resistant four-yarn strands (3), where-

as transversely it has a yarn with a section perpendicular to said strands (3) of loops and a yarn with a section in each of the respective diagonals, said sections being alternately formed by the yarns (1 and 2), simultaneously providing the fabric with elasticity and resistance.

[0022] The fabric has the elastomeric yarn (1) in a bar of the weaving machine with a warp knit with a 3-1-1/0-2-2// weave in the first reed of the machine, and with an all full yarning, whereas the yarn (2) is arranged in the second reed of the machine, with a 1-2-1/1-0-1// weave in this second reed, and an all full yarning. This fabric has the synthetic fiber yarn (2) mainly arranged on one face and the elastane yarn (1) on the opposite face.

[0023] Having sufficiently described the nature of the invention, as well as a preferred embodiment, it is stated for all intents and purposes that the materials, shape, size and arrangement of the described elements can be modified, provided that this does not involve an alteration of the essential features of the invention which are claimed below.

Claims

1. An elastic fabric, of the type comprising a warp knit fabric with synthetic fiber and elastomer fiber yarns, the yarn (1) of the weft of first bar of the machine being formed by an elastomer and the yarn (2) of the warp or second bar of the machine is formed by a synthetic fiber, the fabric comprising the yarn (1) with a 3-1-1/0-2-2// weave and the yarn (2) with a 1-2-1/1-0-1// weave, the yarning for both yarns (1 and 2) being all full, **characterized in that** the weave between the yarns (1 and 2) of the fabric forms parallel and resistant four-yarn strands (3) by means of consecutive loops in a longitudinal direction of said fabric, these strands (3) being configured by the two parallel yarns and the turn thereof, the yarns (1 and 2) being alternately arranged coming out of the loop in a transverse and diagonal direction with respect to said strands (3) of loops, thus forming a hybrid mesh of extensible and resistant yarns with improved tension and which does not roll up when it is subjected to traction.
2. The fabric according to claim 1, **characterized in that** the yarn (1) is a chlorine-resistant elastomer.
3. The fabric according to claim 1, **characterized in that** it comprises a silver salt coating on the fabric with antibacterial and odor elimination functions, being adapted to the final needs and standards to be complied with or final use.
4. The fabric according to claim 1, **characterized in that** the yarn (2) comprises microcapsules of delayed-release substances.

5. The fabric according to claim 4, **characterized in that** the microcapsules comprise aloe vera, anti-dust mite substances, anti-static substances and/or moisturizing substances, according to its final use. 5
6. The fabric according to claim 1, **characterized in that** it comprises added silver yarns, carbon fiber yarns and/or yarns of other materials incorporated among the synthetic yarns to confer antibacterial, static electricity conducting and/or thermal properties, according to its final use. 10
7. The fabric according to claim 6, **characterized in that** the added yarns substitute part of the yarns (2) in the second bar. 15
8. The fabric according to claim 1, **characterized in that** it comprises between 30% and 70% by weight of synthetic fiber yarn (2). 20
9. The fabric according to claim 8, **characterized in that** it comprises 60% by weight of synthetic fiber yarn (2).
10. The fabric according to claim 1, **characterized in that** it comprises between 30% and 70% by weight of elastomeric yarn (1). 25
11. The fabric according to claim 10, **characterized in that** it comprises 40% by weight of elastomeric yarn (1). 30
12. The fabric according to claim 1, **characterized in that** the elastomer is elastane. 35
13. The fabric according to any of claims 1 and 10, **characterized in that** the yarn (1) is an elastane fiber between 11 and 210 deniers.
14. The fabric according to claim 1, **characterized in that** the yarn (2) is a polyamide fiber. 40

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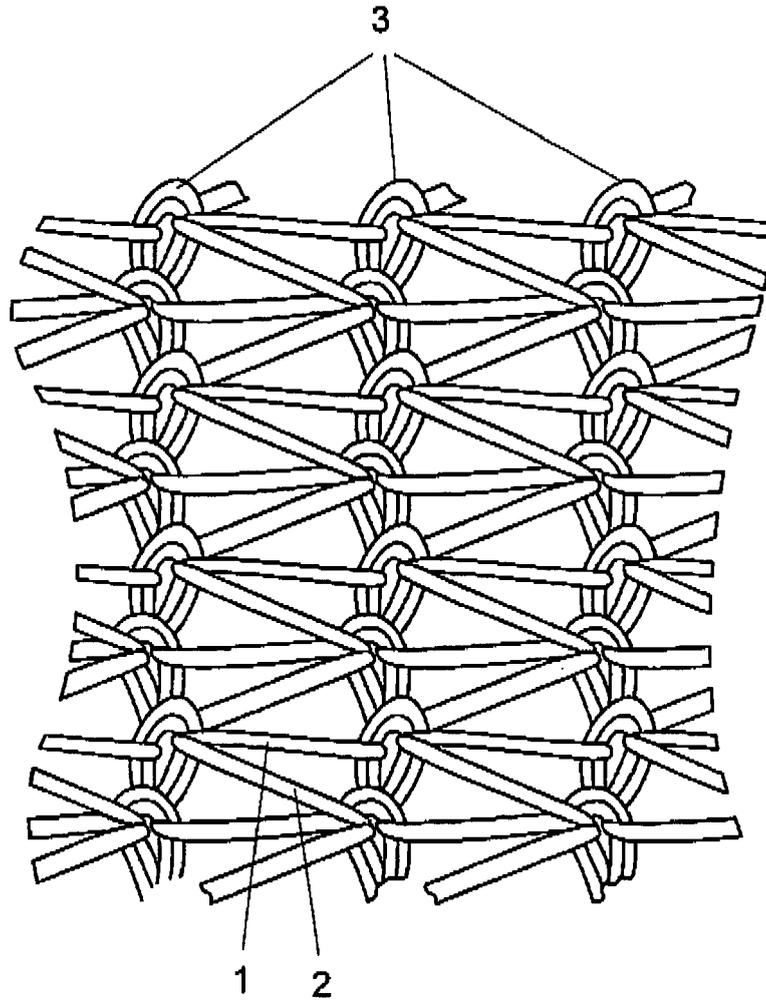


Fig. 1

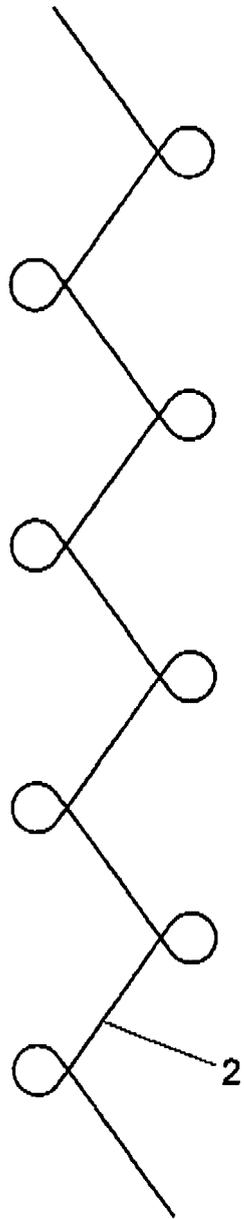


Fig. 2

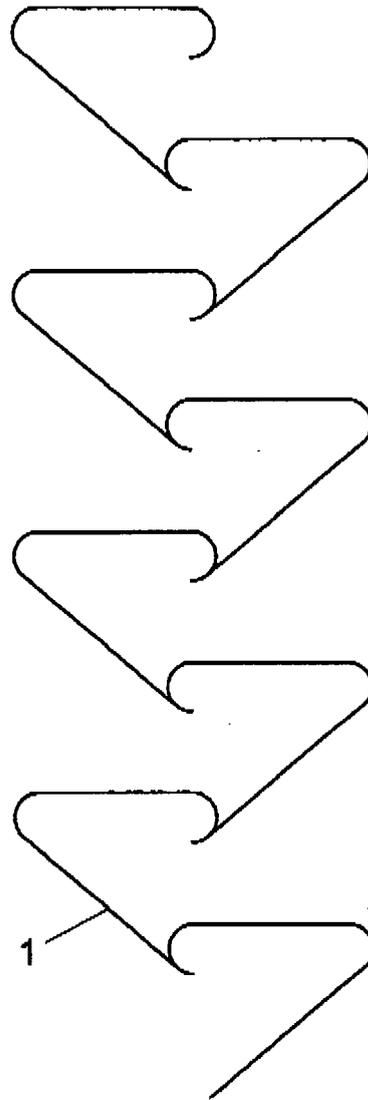


Fig. 3

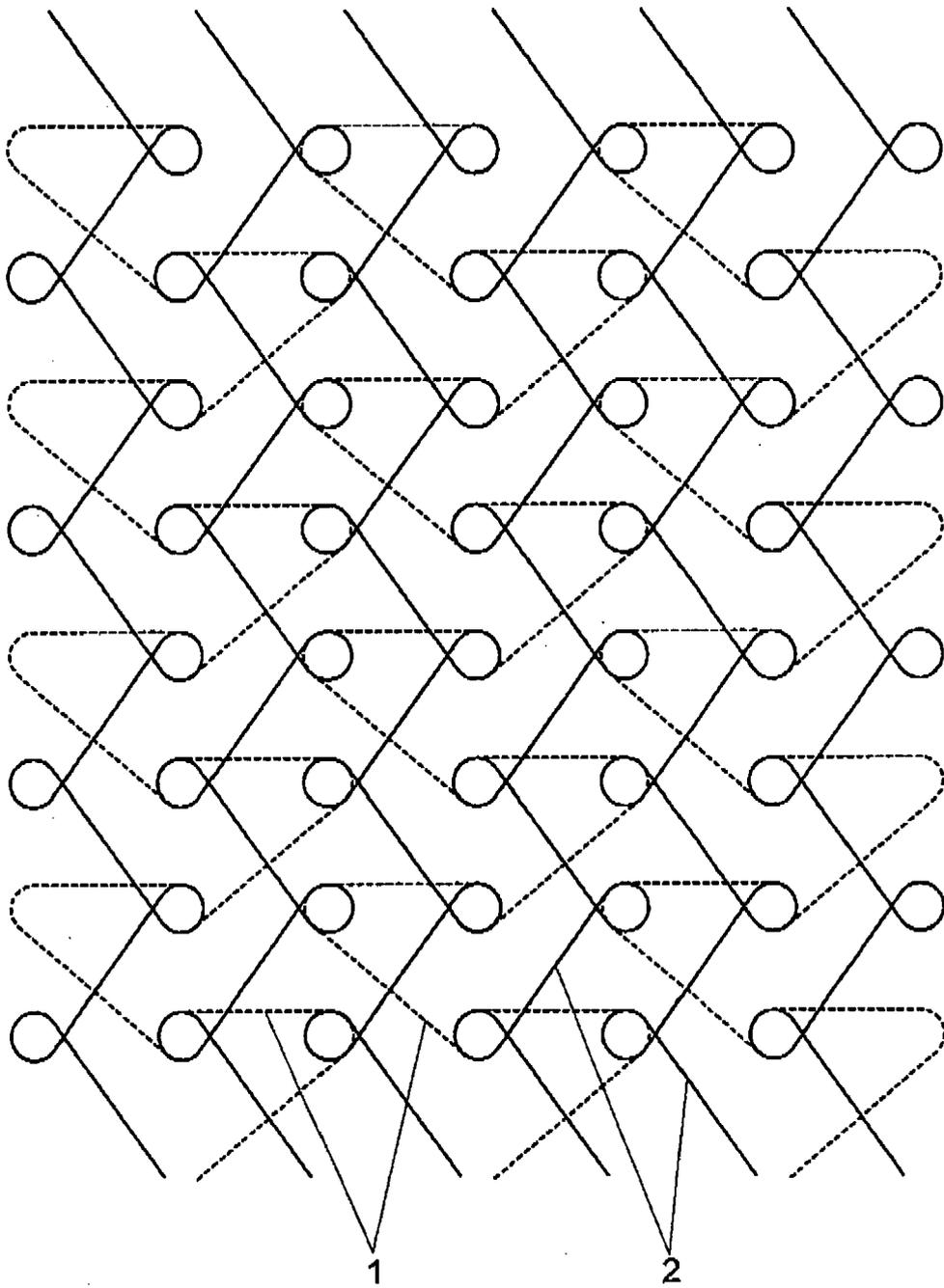


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 09 00 0762

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
D,X Y	ES 1 063 287 U (ALOY FONT JUAN MANUEL [ES]) 16 October 2006 (2006-10-16) * the whole document *	1,8,10, 12-14 2-6	INV. D04B21/18
Y	US 2005/288417 A1 (HUTTE STEPHAN [DE] ET AL) 29 December 2005 (2005-12-29) * paragraphs [0012], [0052], [0067] *	2	
Y	ANDREA BÖHRINGER ET AL.: "Antimikrobielle Textilien" INTERNATIONAL TEXTILE BULLETIN, vol. 5/2000, 1 October 2000 (2000-10-01), pages 12-32, XP002547717 CH-8952 Schlieren-Zürich, Schweiz * page 18, column 1, line 1 - page 24, column 2, line 2; figure 3; table 3 *	3-5	
Y	EP 1 008 682 A (FIRSTER CO LTD [JP]) 14 June 2000 (2000-06-14) * paragraphs [0023] - [0025], [0051], [0052], [0074] *	6	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) D04B
Place of search Munich		Date of completion of the search 29 September 2009	Examiner Sterle, Dieter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 00 0762

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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29-09-2009

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
ES 1063287	U	16-10-2006	NONE	

US 2005288417	A1	29-12-2005	CA 2510039 A1	17-12-2005
			CN 1782148 A	07-06-2006
			DE 102004029274 A1	05-01-2006
			EP 1607499 A1	21-12-2005
			JP 2006002336 A	05-01-2006
			KR 20060046472 A	17-05-2006
			MX PA05006539 A	21-12-2005
			SG 118374 A1	27-01-2006

EP 1008682	A	14-06-2000	EP 1959040 A1	20-08-2008
			WO 9957350 A1	11-11-1999
			JP 3859240 B2	20-12-2006
			US 2001022096 A1	20-09-2001

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 200601425 U [0006]