Supreme is said to be very robust under high pH conditions, high temperatures, and high hydrogen peroxide levels. It even removes residual hydrogen peroxide at 1,000 ppm.

As an alternative to hot water rinsing and reducing agents, Terminox Supreme also offers considerable reductions of water and energy. Where traditional bleach clean-up processes use sizeable amounts of water for rinsing and high amounts of energy for heating and pumping the water, enzymes simply split H2O2 into H2O and O2 and make further rinses unnecessary before dyeing.

Novozymes says that water savings with enzymatic bleach clean-up can be as high as 20,000 litres of water per ton of textile.

Teijin Introduces Twaron® 550f1000

The Netherlands-based Teijin Aramid BV — manufacturer of aramids including Twaron® Sulfron®, Teijinconex® and Technora®; and a subsidiary of the Tokyo-based Teijin Group — has launched a new higher-performing lightweight aramid yarn that offers improved ballistic protection in body armor for police, military and law enforcement officers.

According to Teijin, Twaron 550f1000 is the finest filament aramid-based yarn in the world. It comprises 1,000 filaments, offering significantly better performance than comparable yarns; and has the highest tenacity combined with breaking strength of all the yarns in Teijin Aramid's porfolio. Twaron 550f1000 offers improved resistance in exposure to the blast effects of roadside bombs, good fragment resistance, and enhanced bullet protection.

The yarn will be used primarily in soft anti-ballistic products for the police, military and law enforcement markets; but may also be used in a woven fabric for anti-ballistic and anti-stab products.

"This new yarn is our response to the demand for lightweight ballistic protection, which itself is the result of the increasing threat of violence in society," said Karl Henke, business manager, Ballistic, Teijin Aramid. "Police officers, soldiers and even private citizens who require protection will start wearing a bulletproof vest earlier when the weight and comfort is even better than nowadays."

Surat polyester sarees to be costlier

The increase in the prices of raw materials like dyes and chemicals, polyester yarn, and the recent increase in procurement prices of lignite and natural gas are likely to result in an increase in the cost of polyester sarees and dress materials produced in Surat, India's largest man-made fibre (MMF) cluster.

In the last few months, the price of polyester yarn has jumped by nearly 20 percent on account of hike in the price of crude oil and the depreciating Indian currency. This has led to an increase in the cost of production of grey fabrics.

The prices of dyes and chemicals have also gone up by 7-8 percent in the recent past. This, along with the increase in the cost of natural gas and lignite, has brought severe pressure on textile processors to raise the job charges of dyeing and printing of the finished fabrics by Re 1 to Rs. 2.50 per metre.

Speaking to fibre2fashion, Mr. Pramod Chaudhary, Chairman of South Gujarat Textile Processors Association (SGTPA), said, "An increase in the cost of dyes & chemicals, natural gas and lignite has forced the textile processors in the city to increase the job charges by around 10-15 percent in the past few days. Hence, the production costs have increased and Surat polyester sarees will now be costlier by Rs. 20-25 per saree."

Briefing about production and supply of Surat polyester fabrics and sarees, he says, "Surat produces about 60 million metres of polyester fabric per day. A polyester saree, is usually, 5-5.5 metres long. Surat supplies these sarees throughout India."

Surat meets around 40 percent of annual demand in India for polyester fabrics and sarees. While it exports sarees and dress materials worth Rs. 12 billion, its turnover in the domestic market would be around Rs. 20 billion per annum.

With the winter season nearing an end and the beginning of the marriage season, the demand for 'made-in-Surat' sarees is picking up.

products, several others sought to defer purchases. The recession urged industry participants to resort to cost saving measures such as work furloughs, line closures and staff reductions to survive in the competitive environment. Several countries adopted protectionist policies in order to deal with social and political instability, decline in international trade, and closure of factories. The industry however recovered driven by the economic stimulus packages offered by various Asian countries. Governments of various countries implemented strong policy framework and provided support to intensify the pace of recovery. The global textile industry is also witnessing the sustained migration of manufacturing activity from the developed nations to developing countries.

China dominates the global textile market in terms of annual production capacity for cotton textiles, woolen fabrics and chemical fiber garments. In view of the recession, China adopted a different strategy to focus on domestic market, as against the earlier export-oriented operations. Improving economic conditions, coupled with favorable government support policies as well as industrial upgradations contributed to the increase in industry's production output. Domestic demand is expected to drive production, sales and exports growth in the Chinese textile industry. Factors such as favorable infrastructure, liberal labor laws, and social security are expected to contribute to the industry growth.

Cotton is a major raw material used in about 40-50% of textiles. In addition, cotton makes up for about 85% of all natural fibers, other than wool, hemp and linen. Cotton consumption is largely driven by population growth, as evident by the fact that consumption has tripled during the period 1950 and 2009. In addition, factors such as rising per capita incomes, stable or falling prices of cotton in comparison to other fibres, and extensive promotional campaigns of market participants have contributed to substantial growth in demand for cotton. India, China, Pakistan and the US dominate the global cotton production.

The global market for technical textiles is set to grow rapidly driven by the expanding use of the material in emerging markets. Asia, in particular, is expected to emerge as a force to reckon with in the technical textiles market due to rapid growth in local markets, and the rising installation of local production capacity. Asian countries such as Japan, China, Taiwan, India, and Korea are expected to drive global consumption of technical textiles. In particular, India is expected to emerge as a major player largely due to the abundance of raw materials, and availability of skilled manpower. The geotextiles segment is expected to register the fastest growth in view of climate changes that are increasing the threat of hurricanes, and floods, among other disasters. Germany, France, Japan, UK, Korea, India, China, and the US are the leading producers of technical textiles, globally.

The research report titled "Textiles: A Global Outlook" announced by Global Industry Analysts Inc., provides a collection of statistical anecdotes, market briefs, and concise summaries of research findings. The report offers an aerial view of the global textiles industry, identifies major short to medium term market challenges, and growth drivers. Regional markets elaborated upon include United States, Canada, Mexico, Japan, Belgium, Czech Republic, France, Germany, UK, Spain, Turkey, Ukraine, China, India, Pakistan, and Brazil, among others. Also included is an indexed, easy-to-refer, fact-finder directory listing the addresses, and contact details of companies worldwide.

New enzyme ensures bleach clean-up savings

Danish bioinnovation company Novozymes has developed Terminox Supreme, a new bleach clean-up enzyme treatment for fabrics that is said to require far less water and energy than conventional methods.

In order to get consistent batch-to-batch dyeing reproducibility, it is essential to have the same starting point. This is achieved by bleaching the fabric in advance, and equally important, by removing all residual hydrogen peroxide in a bleach clean-up process afterwards.As well as ensuring consistent bleach clean-up, Terminox

“Exports remain the driving force behind the sector growth in Italy. The dynamism of major textile markets combined with the ability of Italian machinery manufacturers to assert themselves on a global scale, has contributed to sustaining Italian exports,” ACIMIT, the Italian textile machinery association said in a statement.

“Fully 25% of the sector’s sales abroad are directed to China, with Asian markets generally accounting for 50% of all foreign sales.”

The latest National Institute of Statistics data on Italian exports for the first 10 months of 2011 show significant growth in all markets, whether European (France +44%, Germany +56%); non-European (Russia +88%, Turkey +83%); American (United States +81%, Brazil +15%, Peru +15%); and Asian (Bangladesh +49%, China +11%, South Korea +53%, Japan+30%, India +22%, Indonesia +58%).

ACIMIT says these are all countries where Italian exports also experienced strong growth in 2010.

Weak domestic demand

Demand has remained weak in the domestic market as Italy, like other European Union countries suffer from poor recovery in investments due to the current economic uncertainty. According to ACIMIT, in spite of the growth experienced in 2011, Italian machinery manufacturers remain extremely cautious for the current year.

“Global demand for textile machinery began slowing last summer. The latter months of 2011 and the beginning of this year have confirmed a setback in new orders for many producers. This is a consequence of the current difficult economic conditions,” said Sandro Salmoiraghi, president of ACIMIT.

“The positive outcome of ITMA Barcelona, the industry’s primary trade fair held last September, provided us with some reasons to be optimistic. However, many deals which had been initiated at the trade fair have not yet been finalized, given the state of uncertainty hovering over the future outlook of the markets.”

“Let’s just say 2012 hasn’t started off with the best of prospects. The evolution of the economy over the course of the next quarter will provide a more accurate description of what the future holds for us: whether to expect a recovery or renewed stagnation."

"The economic slowdown has also affected and currently affects developing countries as well, including their textile sectors. The drop in consumer spending in developed markets has penalized major garment exporting countries - above all China. In 2012 it will be difficult to find markets capable of significantly increasing their installed production capacity,” predicts Salmoiraghi.

Need to be supportive

ACIMIT says that in hard times such as these, institutions must be as supportive as ever.

“Roughly 80% of production in our sector is directed at foreign markets,” attests Salmoiraghi.

“This high propensity towards exports, combined with the comparatively small size of our manufacturers, means that they absolutely must be supported in order to face up to international competition.”

Salmoiraghi’s appraisal for the reconstruction of the ICE – Italian institute for foreign trade, is accompanied by the hope that the agency will rapidly return to full scale operations.

“The ICE is an essential element in a mosaic that must be completed with a greater level of support from the banking system, which many Italian SMEs have called upon to ease access to credit during these difficult times,” he concludes.

Global textile fiber market to reach 93 million tons by 2015

GIA announces the release of a comprehensive global outlook on the Textiles Industry. Global textile industry dynamics are shaped by a wide range of demographic factors such as disposable income levels, degree of consumer confidence and other general economic variables. Future growth would be driven by segments such as geosynthetics, filtration products and medical products that have survived the adverse economic conditions.

Demand for textile and garments declined considerably in 2008 and 2009, particularly in the US, Japan and Europe due to the rising unemployment levels and decline in consumer confidence. While few consumers exhibited preference for low-priced

World Textile News

Korea buys up Vietnam garments

Garment and textile exports to South Korea could pass the US$1 billion mark this year, making it the fourth largest buyer of Vietnamese products after the US, the EU and Japan.

Export of garment and textile products to the country last year reached a record of more than $904 million, up 145 per cent over 2010, according to the Viet Nam Customs Department.

Alongside the increas-ing export turnover, the garment and textile sector in the past years has also attracted many Korean investors, the Viet Nam Textile and Apparel Association (Vitas) has said.

About 450 Korean firms are working in the sector in Viet Nam with a total registered capital of $1.8 billion. They have greatly contributed to the increase in export turnover of garment and textile products to the market.

Phan Van Kiet, deputy general director of the Viet Tien Garment Corporation, said there was still huge potential to increase export of textile and garment products to the Korean market. He explained that South Korea had changed the structure of its garment and textiles sector, focusing on the high-end segment, while young people in the country demand increased diversification.

Domestic garment and textile firms should increase promotion of their products to boost exports to the market in the coming years, he said.

The Korea-ASEAN Free Trade Agreement in 2007 has significantly increased trade between the two countries, according to the Viet Nam National Textiles and Garment Group (Vinatex).

The group has asked its members to use the FTA more effectively.

Viet Nam and Korea are set to sign a bilateral Free Trade Agreement in the near future. When it happens, the export of garment and textiles as well as other items like footwear and wood products is expected to increase further, according to Vu Duc Giang, Vitas chairman.

Continued growth for Italian textile machinery sector

In spite of an increase in production for 2011 by Italian textile machinery manufacturers, forecasts remain cautious for the current year. Provisional figures for 2011 for Italy's textile machinery sector show a further increase in manufacturing production and exports, following a good recovery in 2010 and a recession hit 2009.

The value of Italian textile machinery production for 2011 registered a 9% increase compared to 2010, from 2.4 to 2.6 billion Euros. A similar increase was recorded for exports (+10%), which reached a value of just over 2.1 billion Euros.

one silk producer, followed by India, Thailand, South Korea and Iran.

"We shall focus on setting up modern factories to process the silkworm," he said.

Mousavi said Uganda will be exporting silk worth $200,000 (about sh560m) every year once production commences, adding that the country's climate was conducive for silk production.

"Whereas we can produce silk only once a year in Iran, in Uganda, we can produce it seven times," Mousavi said. Mousavi started investing in silk production in Uganda in 1992.

"We have the capacity of producing 30 bags of egg worms from just one hectare of land," he explained.

Silk, a natural protein fiber, can be woven into textiles. The best-known type of silk is obtained from the cocoons of the larvae that feed on leaves of the mulberry tree.

The shimmering appearance of silk is due to the triangular prismlike structure of the silk fiber, which allows silk cloth to refract incoming light at different angles, thus producing different colors.

"Textile manufacturing will be possible with this silk produced from the moth of caterpillars," Mousavi said.

"Silk's absorbency makes it comfortable to wear in warm weather. Its low conductivity keeps warm air close to the skin during cold weather."

A silk tie in Europe goes for $600 (about sh1.7m). "Once the investment grows and we get government support, we can start producing upholstery, wall coverings and carpets," Mousavi said.

Iran's handwoven carpet exports decline marginally

Exports of handmade carpets from Iran showed a marginal decline of 3.6 percent year-on-year to US$ 439 million during the first ten months of the current Iranian calendar year that began on March 21, 2011.

Germany, Lebanon and the UAE were the main countries that imported Persian carpets during the period.

Iran had set a target of US$ 600 million for the current calendar year, compared to last calendar year's handmade carpet exports worth US$ 556 million.

In 2010-11, Iran achieved a 12 percent year-on-year rise in its handwoven carpet exports, which was 4 percent rise in terms of volume compared to its previous year.

Iran Presents Technological Capabilities at Nanotech 2012 Exhibition

Japan Nanotechnology Exhibition, Nanotech 2012, was inaugurated at Tokyo International Exhibitions Center on February 15th with six companies from the Islamic Republic of Iran actively participating in the event, for the fifth consecutive year.

The mentioned Iranian participants are as follows: Payamavaran Nanotechnology Fardanegar (manufacturer of nanomaterials synthesis equipment), Fanavaran Nano-Meghyas (manufacturer of electrospinning and elecrophoresis equipment), Nanotechnology System Corporation (NATSYCO) (manufacturer of STM and AFM microscopes), Iran Riff Company (producer of nano paints), Nanostructured Coating Company (manufacturer of sputtering apparatus) and Middle East Bio-Researchers (producer of ethylene adsorbents used to improve the preservation of agricultural crops).

In addition, the Iranian fabricated version of the anticancer drug Doxorubicin HCl, which has been proved to be effective in treatment of a wide spectrum of cancers, was put on display in Nanotech 2012.

Of other participating countries of the event mention can be made of Belgium, Canada, Germany, South Korea, Finland, Spain, Switzerland, Taiwan, Czech Republic, Britain and the US.

Concurrently with the opening day of Nanotech 2012, Asian Nano Forum (ANF) members took the opportunity to hold a meeting with the Iranian representatives in attendance. Also, a seminar focusing on Iran's capabilities and growth in nanotechnology is arranged to be delivered on the last day of Nanotech 2012.

The Japan Nanotechnology Exhibition is marked as the world's biggest and most prestigious exhibition in the field and has been held consecutively for eleven years. The Islamic Republic of Iran is currently attending this significant event abreast other pioneering countries like the previous five editions.

Iran Textile News

7th Int'l Exhibition for Textile and Leather Machinery, Products and Garment(ISATEX 2012) 8 - 11 May 2012 Yazd – Iran

Textile is one of the oldest and most important industries and almost a century has passed since the establishment of it is factory in Iran.

Textile production is among the most varied and sporadic industries in the world enjoying very dynamic trade worldwide, it is probably the first commercial activity that began in the small workshops and at home in its primary form. The archaeological evidences dug in susa shows that industry goes as far back as four thousand years B.C. in Iran.

One special aspect in the production of textile and leather goods which is critically important from the point view of the manufacturers is access to the latest technology that has brought about a more efficient production process and higher quality in other countries. The first international textile and leather machinery and related industries fair is providing our manufactures with a golden opportunity to acquaint themselves with the latest state of the art in textile and leather machinery and at the same time display to the public their own achievement in the field.

Abundant skilled labor and suitable raw material combined with long experience have granted our textile and leather products a remarkably high added value and exhibitions of this kind can further familiarize the manufacturing units of our country with the new industrial developments and changes in the world markets, thus aiding them to enhance the technical know-how required in their field of activity.

The Sima Nassaj Research & Engineering Company while wishing great success for every participant would like to express its gratitude to all the domestic and foreign firms for their active participation in this year's fair where they can exhibit their textile and leather machinery and other related products.

Uganda to export silk to Iran

Uganda is set to start exporting the silk worm to Iran. Mohammad Ali Mousavi, the chairman of Iran-Uganda Establishments, said the production of silk from the 1,000-hectare farm in Kisozi, Gomba district is set to start next month.

Mousavi said over 500,000 mulberry trees had been planted over a period of 10 years. The silkworms feed on the leaves of the mulberry tree to produce silk.

“Now is the time to reap. The investment is worth $9m (about sh27b),” he said. “Once we start, we shall be producing at least 1,500 tonnes for exportation to Iran.”

Mousavi said about 5,000 jobs will be created once production kicks off. “We have 14,000 hectares, but we are currently utilizing only 1,000. We hope to increase production this year,” he said.

The multibillion investments is an initiative of the Iran Agro Industrial Group. Mousavi said if production hits full capacity, Uganda will be among the top producers of silk in the world. China is the number

The needles (2) are placed on the circumference of a cylindrical bearing (1), where camboxes are acting on their butts (3). Outside of the needle bearing, a bottom warp is wound on flanged beams (4), fixed on brackets (5) and connected by a ring (6) placed on the bottom plate (7). The top warp wound on flanged beams (8) is fixed to guide bar brackets (9) connected by a ring (10) placed on the top plate (11). The needle bar (12) introducing the bottom warp threads is also fixed to brackets (5), while the needle bar (13) introducing the top warp threads is fixed to guide bar brackets (9). Bobbins (15) are placed on the base of the machine (14), and then the threads are unwound and led by the guides (16) to the thread carriers (17), introducing the threads under the needle (2) hooks. The carriers (17) are mounted on the top plate (11). A knitted fabric (18) is then wound on the beam (19).

According to the invention, the process of forming a course of loops occurs as a result of simultaneously introducing both warp and weft threads under the needle hooks, this way forming a warp knitted and a weft knitted structure. For this purpose, the needles, needle bearing, warps and needle bars introducing the warp threads move in relation to the motionless camboxes.

The warp threads running from the newly formed loops, which are behind the needles, to the needle arms placed before the needles must be introduced under the hooks of the needles in the final stage of each working space. In order to fulfil this condition, the warp threads should be introduced into the space between the needles in the first stage of each working space, whereas in the final stage, the warp threads should be introduced before the needle hooks. This is achieved thanks to a certain arrangement of the needle arm's orifice and needles, as well as to a certain relation of the speeds of the needles and the needle arms.

Therefore, the pitch of warp threads in a needle bar equals the quotient of length, on which the needles are arranged in one working space of the cambox, and the number of needles decreased or increased by a value of 1. It results from the fact that the number of orifices of the needle bars over the length of one working space is higher or lower of one orifice depending on the number of needles in one working space. An increase or decrease in the number of orifices of the needle arms depends on the direction of warp threads knitted in the fabric.

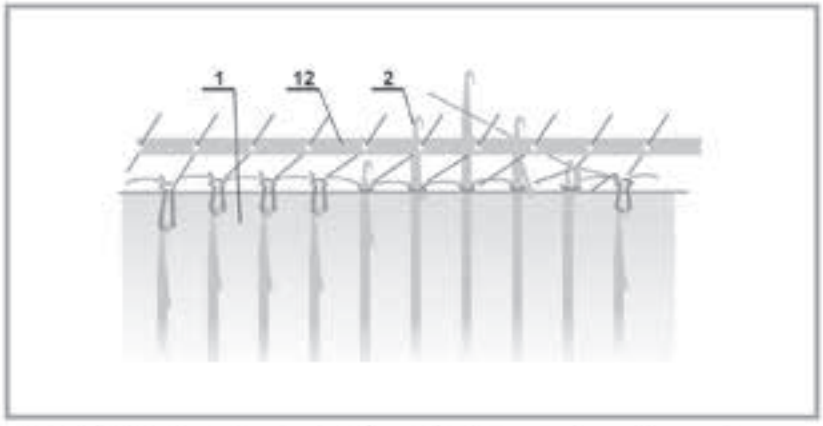

Figure 6. *Pitch of warp threads and orifices of needle arms in the working space.*

Moreover, depending on the direction of warp threads knitted in a fabric, the needle bars and warps have to move in relation to the needles, in each working space, over a length of a path bigger or smaller than one pitch of warp threads in the needle bearing.

By fulfilling the conditions mentioned above, warp threads are introduced between the needles at the beginning of the loop course forming cycle, and next the threads are wrapped around the needle shanks from the side of the hooks due to further motion of the needles and warps with regard to the cams. The process is presented in ***Figure 6***.

At the same time, threads forming the weft knitted structure are also introduced under the needle hooks. Therefore, the warp and weft threads are knitted into a fabric during the displacement of needles reaching the position in which the loops are formed.

Summary

The new technique of forming weft-warp knitted structures presented in the article enables to produce knitted fabrics of new properties, resulting from the possibility of obtaining hitherto unknown knitted structures. The structures of these knitted fabrics can be composed of a few configurations of threads running along the courses of loops and in skew directions to the line of the courses of loops. Such a configuration of threads in a stitch enables to obtain, for example, knitted fabrics of higher tensile strength and lower deformability in all directions.

The technique of forming weft-warp knitted structures with the use of adequately modified cylindrical warp-knitting machines enables to predict the high efficiency of the knitting process.

It seems that machines using this novel technique of forming weft-warp knitted structures would meet with the great interest of manufacturers of knitted fabrics due to the new properties of these knitted fabrics, which are important for traditional products as well as for new technical applications.

Acknowledgment

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The disadvantages of the prevailing technological solutions mentioned above were eliminated in the knitting technique presented in [5], which is the basis for the technology of weft-warp knitted fabrics.

New technique of forming weft-warp knitted fabrics

The device used in this new technique for producing weft-warp knitted fabrics works in a single-stage process, which means that this process is a continuous one, simplifying the technological process and obtaining highly efficient production in comparison with the techniques of producing these fabrics used nowadays. This simplification of producing a knitted fabric and the possibility of increasing the efficiency of this process, as well as the possibility of obtaining new, novel knitted structures is guaranteed by the use of technology based on the process of producing a knitted fabric using a machine with a needle bearing of cylindrical shape. The novelty of these structures is in the fact that the warp threads forming the warp knitted stitch are arranged in the same direction in all courses in the knitted fabric, making the structure of the knitted fabric uniform over its whole surface.

The knitting technique applied, which enables to produce warp knitted fabrics using machines with a cylindrical needling configuration, is novel on a global scale. Although in the 30's cylindrical knitting machines (Maratti) were manufactured for the production of warp knitted stitches, they were based on a different knitting technique, characterised by low efficiency, which caused the recalling of these machines from the market [4]. Not to mention the fact that these machines were used only for the production of warp knitting stitches, with no possibilities of forming weft-warp knitted structures.

The solution to this problem is the invention [5] of a new way of forming weft-warp knitted fabrics and a novel device for their production.
An example of a device for producing knitted fabrics with weft-warp stitches is presented in ***Figure 4***, showing a general view, and in ***Figure 5***, showing a fragment of a cross-section of the device in the axial plane of a cylindrical needle bearing.

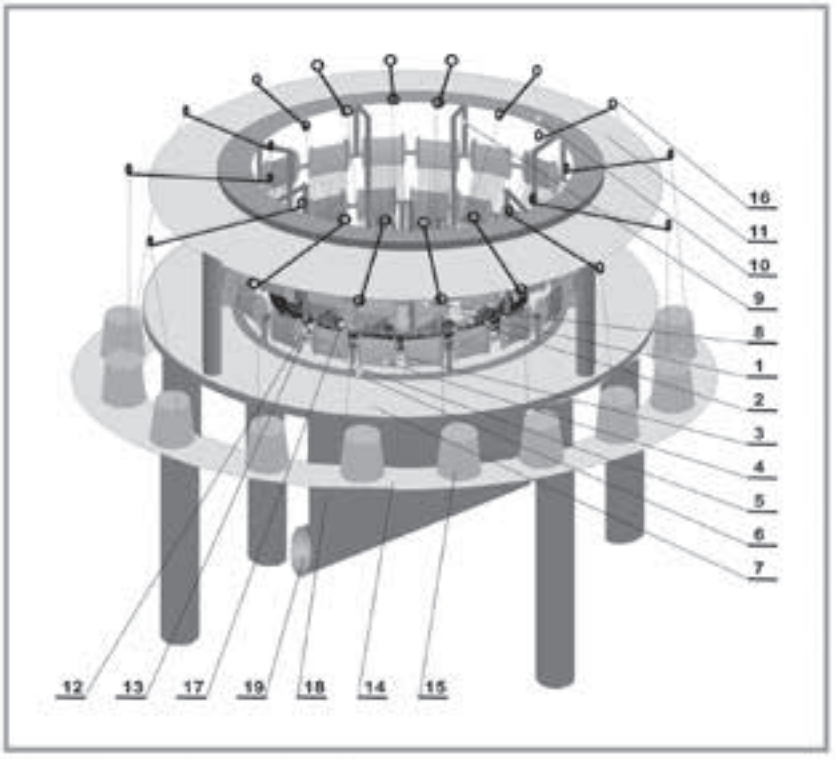

Figure 4. *General view of the machine.*

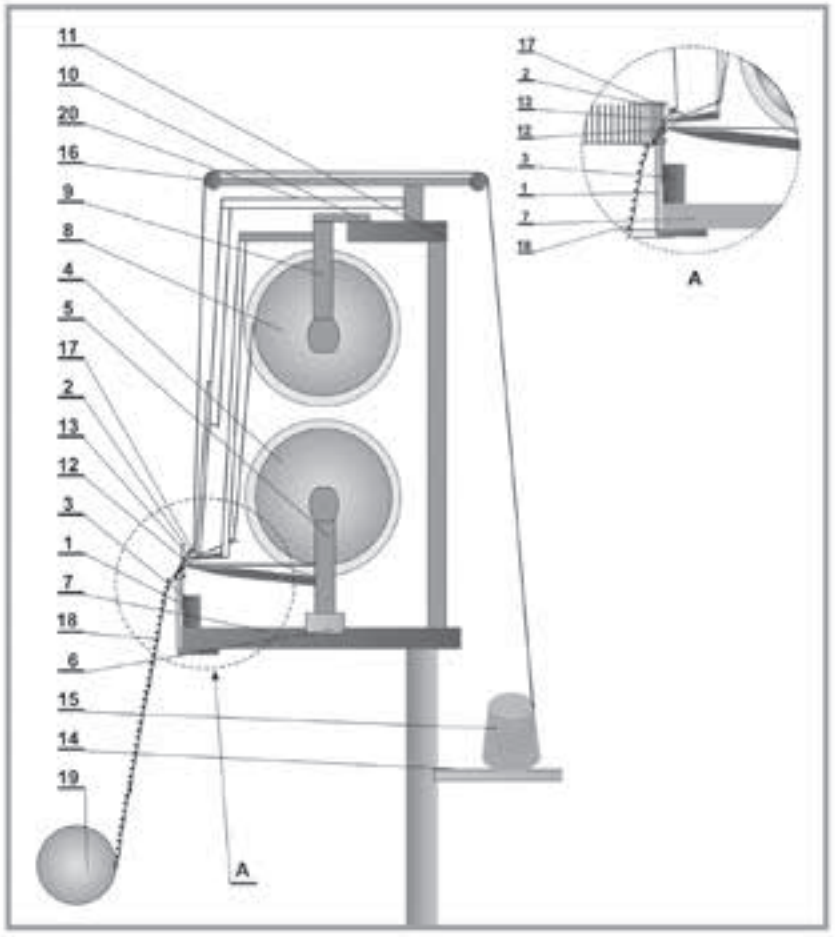

Figure 5. *Cross-section of the machine and loop forming elements presented in as fragment A*

press release

New Technique for Producing Weft-Warp Knitted Fabrics

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Abstract
The combination of two groups of knitted structures, weft knitted and warp knitted fabrics, into one constitutive weft-warp knitted stitch enables to obtain new properties of knitted fabrics. This paper presents a new technique for producing weft-warp knitted fabrics with the use of a cylindrical knitting machine of modified structure that ensures a high quality of the knitting process.

Key words: *weft-warp knitting stitches, cylindrical knitting machine.*

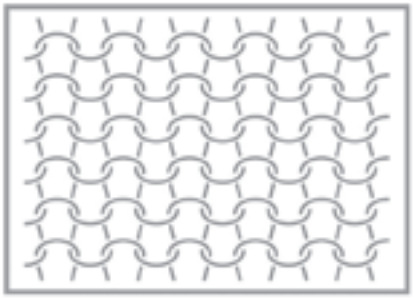

Figure 1. *Weft-knitted fabric.*

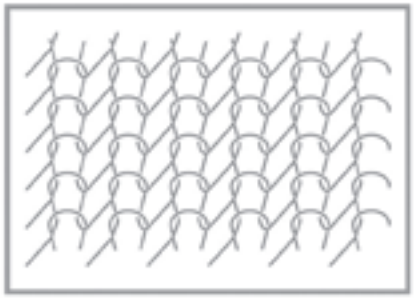

Figure 2. *Warp knitted fabric.*

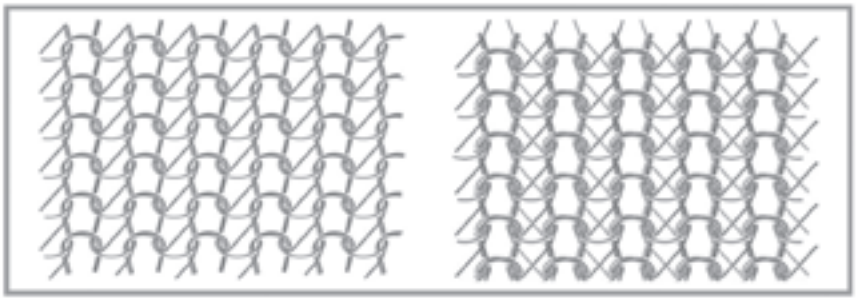

Figure 3. *Weft-warp knitted stitch.*

Introduction

Knitted fabrics are commonly used as clothing and technical products, whose users expect them to have new properties helping to fulfil their requirements.

The properties of knitted fabrics are greatly influenced by their structure, which is a result of the arrangement of yarns in a stitch. The kind of stitch used depends on the specific knitting technique applied. Two kinds of this technique, the weft-knitting and warp-knitting, are commonly used for obtaining:

- weft-knitted fabrics, in which stitches are characterised by yarn forming subsequent loops in a course (***Figure 1***).
- warp-knitted fabrics, in which stitches are characterised by yarn forming subsequent loops in subsequent courses (***Figure 2***).

These two different arrangements of yarn presented in the above-mentioned groups of stitches of the knitted fabric significantly influence the properties of these products.

Therefore, the combination of these two groups of stitches into one weft-warp stitch (***Figure 3***) enables to obtain new properties of knitted fabrics.

Mainly it concerns mechanical properties (strength, elongation and elasticity in different directions of stretching), which is especially important for knitted fabrics designed for technical products.

Prevailing reports indicate that weft-warp knitted fabrics are of great interest for some research centres [1, 2, 5]. However, the properties of these knitted fabrics have not been hitherto investigated thoroughly enough [3], mainly because of the lack of knitting machines designed for manufacturing these fabrics. Both a device constructed in the 70s at the Department of Knitting Technology of the Technical University of Lodz and the flat knitting machine manufactured by Shima Seiki company are based on a very sophisticated and low efficient method of knitting, which is caused by the presence of two working stages in the process of forming each of the courses of loops. In the first stage warp threads are introduced under a needle beard, forming a warp stitch. In the second stage loops of the weft knitted fabric are formed by yarn unwounded from a beam. Moreover, the arrangement of yarn forming the warp knitted stitch has to change the direction of run of underlaps at every few courses, disturbing the structure of the stitch and the whole technological process.