ITMA NEWS ON COTTON

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As my following speakers will give you further details on the machines I am now talking about, I would like to apologize in advance for the redundancies which can occur.

The ITMA Barcelona has shown innovations which demonstrated the high level of the spinning machine industry. Innovative enterprises are by far less exposed to the price competition. On the other hand through the high development costs of a new machine, the decision on the right path for innovations becomes chancier, so that wrong decisions have huge effects on the future of the enterprise.

Which were the drivers of innovations at the ITMA? In 2007 it was still about production costs of the machines with a reduced range of functions, now with the demonstrated new developments the productivity of the machines was considerably increased. But the energy consumption and the use of raw materials were also in the center of attention.

I would like to use this opportunity to describe the technological differences of the essential innovations on the following machines:

Carding	Upon the sliver preparation, it enforces the concept of the productivity increase via enlarging the carding area of the carding cylinder with more width. These innovative machine concepts received a considerable confirmation by further providers- but with constructive differences.
Compact spinning	The development of the compact spinning stagnates. The processes have not changed during the last ITMA cycle. The development seems to be finalized.
Rotor spinning	A completely new concept was introduced with the automation of every spinning position, whereas the flexibility is in the foreground. Two new machines with different focuses give alternatives for the customers.
Air Jet spinning	A new spinning principle is establishing itself through a new supplier. The distinct increase in productivity of this process is competing with ring spinning.
„Spinnit“	An unusual shortening of the process through the combination of spinning and knitting was introduced.

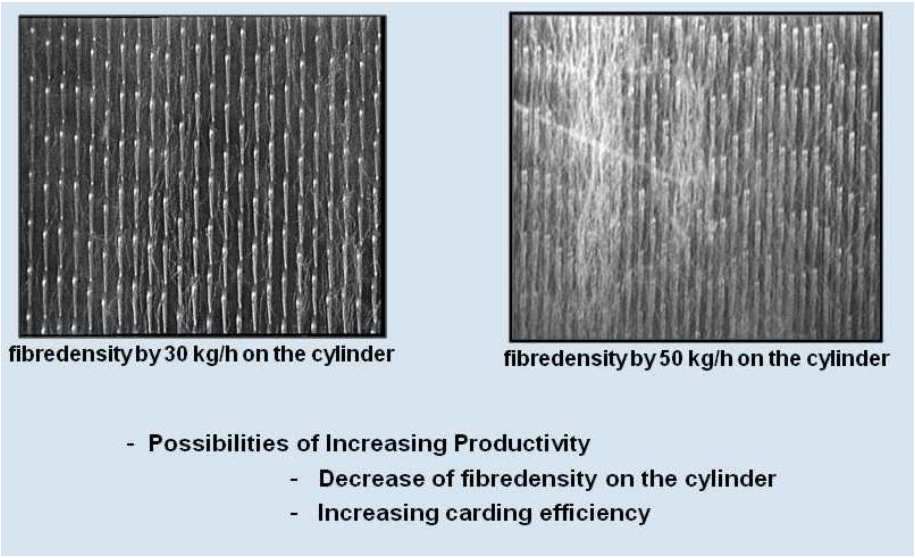

Fig.: 1 Fibre density on the cylinder

For the card the direction of development is clearly leading towards increase of productivity. This description in the slide shows a view of the cylinder of a card with a low and high fibre density, therefore low and high productivity. In general in the 80's and 90's an increase of the fibre throughput of the card was effected through the rise of the cylinder velocity. The fibre density on the cylinder reduces itself with the gain of the cylinder velocity. Due to the occurring force on the fibre and fibre damaging at about 30 up to 35 m/sec the velocity cannot be more increased. The fibre density of the card is the limitation at the production of the card. At a given retention time of the fibres on the cylinder, no sufficient fibre individualizing can take place with a too high production.

Fibre clouds on the cylinder occur, which without sufficient carding, can pass over to the doffer and result in a too high irregularity of the sliver. Two possibilities arise for the solution of these problems. The increase of the production through the enlargement of the carding area or the increase of the carding intensity.

Through an optimization of the profitability Trützschler has conducted, the expansion of the card to exactly 1,28m. This means that the carding area rises to 5,3 m^2 . In 2007 Rieter already had a card with a cylinder width of 1,5m but with a reduced cylinder diameter. The diameter is 0,8m in comparison to the 1,290m from Trützschler. Hence Trützschler has the bigger cylinder surface and in terms of figures the lowest fibre density. At Trützschler further constructive solutions, which increase the precision of the machine and compensate the temperature influences, therefore enable a total rise of the productivity not about 28 %, but about 40 %.

Rieter on the other hand has increased the number of flats on the new C70 card, which was shown at the ITMA, and in that way has increased the main carding area about 40% compared to the C60, which corresponds with an increase of the carding efficiency. Rieter defines the ACI, the Active Carding Index for this improvement of the carding process. The total flat design as well as an improved adjustment of the

flats are to ensure a preferably constant carding gap. Due to the different geometries of both introduced cards, with the increase of the carding area two separate high-performance carding concepts are available.

A general trend for high-performance cards is the raise of the pins/inch^2 for the doffer. Due to improved adhesion of the card web this permits higher delivery velocities at improved fibre transfer factor.

A further machine with a carding width of over 1,0m was shown by Marzoli.

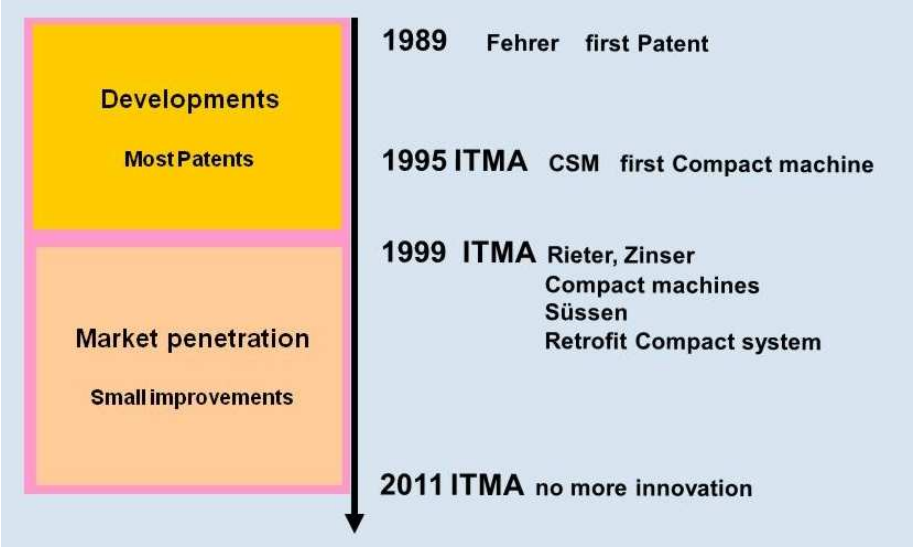

Fig.: 2 Development of compact spinning

The development of compact spinning is nearly completed. Currently almost more than 50% of all sold ring spinning machines are sold as compact machines. The cycle of development took about 20 years. It began with a rather accidental discovery of the fiber influencing through airstreams by Fehrer. It took 10 years until it came to an industrial employment by Rieter for new machines and Suessen for the retrofitting of existing machines. Some time later the machines from Zinser for short-and long staple spinning were introduced. The market penetration took another 10 years. These spinning machines hardly offer an increase in productivity due to the possible reduction of twist in the yarn, but the process reveals a new yarn structure of higher quality, especially regarding the tenacity and reducing the hairiness. Only in the following processes the distinct improvements in productivity can be seen especially in weaving and weaving preparation, which are faster and less interference-prone. In addition, and today that is a bigger advantage, the utilization of raw materials is higher: a low-value raw material can be chosen for the same quality.

Lakshmi as well as Marzoli have followed as supplier of the compact spinning which showed one process alternative each at the ITMA. In each case the compacting is conducted by means of air. At Lakshmi the process is similarly to the CSM process with perforated upper apron. But the front roller pair is missing, which raises the wear

of the apron. At Marzoli a ceramic compacting element between the draw roller and front roller shall compact the fibres by sucking. At the ITMA one could not recognize, by which means the compacting effect was reached, if pneumatic or mechanical. For both processes it is a matter of prototypes, which at first still have to prove their efficiency.

For a long time rotor spinning was on the rebound after a peak in the middle of the 90's. Through low wage costs in China the qualitatively high residing ring yarns are offered at the same price as the rotor yarns. At current the semiautomatic machines are dominating the rotor machine market. Today controlled piecer with manually yarn preparation are state of the art. For this reason an improved quality level arises at the piecer but also a higher operating and wage effort. The recent market of these machines is clearly higher than for the fully automatic machines. However not one of these semiautomatic machines was displayed at the ITMA. In future the fully automatic machines will certainly achieve more market shares.

A completely new concept of a rotor spinning machine was shown by Oerlikon Schlafhorst with the rotor spinning machine Autocoro 8. A technological highlight is the rotor drive with an active magnetic bearing, which enables a rotor speed of about 200.000 r.p.m.. In that way Schlafhorst showed that this new drive had sufficient reserves for daily use. The spinning position automation concept is similar to the Autoconer and makes the autonomous yarn break elimination on every single spinning position possible. A lot change can be executed much faster, as up to 12 spinning positions can be pieced simultaneously. Through the single drives of the winding the machine can be driven to the maximum delivery speed. The advantage of this new overall concept lies with the spinners with frequent lot change, in high flexibility and productivity.

Rieter handles this rise in productivity more conservatively. The new R60 rotor spinning machine reaches this by up to 540 spinning position and a moderate elevation of the rotor speed to 170.000 r.p.m.. The piecing is executed by four robots. Through a considerable revision and refinement of the spinning box the technological data of the spinning box could be improved. Through the new construction a precise adjustment between rotor and the faceplate with the nozzle could be achieved. The CV from spinning position to spinning position was noticeably improved. The changes in the detail, especially in the faceplate and the twist-stop, allow a movement of the twist at the yarn formation towards the rotor groove, whereas the spinning stability is noticeably improved. This enables a minimization of the yarnbreak rate or an increase in production with an equal of yarnbreak rate as before. The thermal conduction at the nozzle has been improved contingent upon construction, which makes an impact on polyester through an increased production.

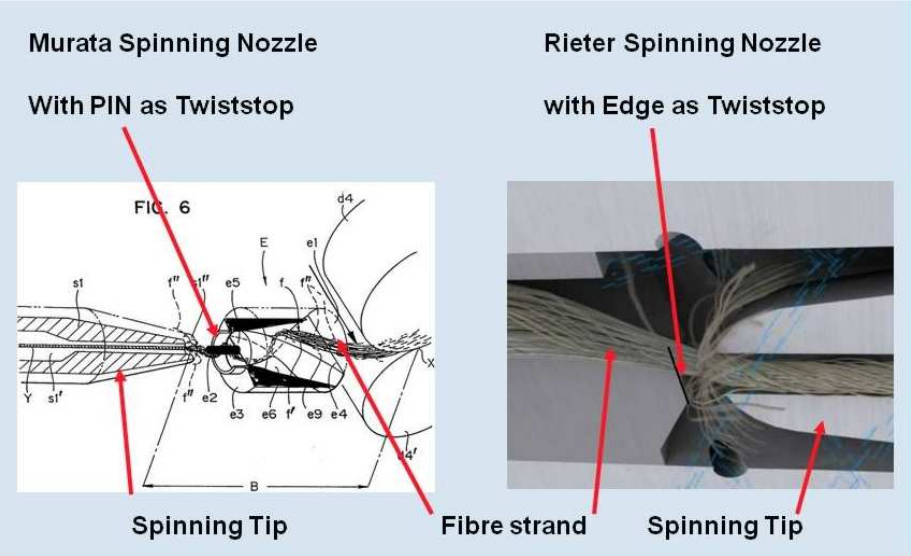

Abb.: 3 Differences in the nozzle design

In the highly productive area of the air spinning technology Rieter presents itself as another supplier on the market with the air jet spinning machine. Besides the productivity, with this kind of machine, further advantages arise from the constant factors of energy consumption. These are the factors in a spinning mill, as e.g. climate and suction in the spinning halls which normally cannot be influenced. Through the omission of roving machines and winding machines further advantages occur. If you compare both machines offered on the market from Murata and Rieter, already at the nozzle design one can see differences. As it is generally known at yarn formation in the nozzle 20% of the fiber ends are separated from the feeded fibre strand and by means of a rotating air stream wound around the remaining parallel fibres. With this principle it is necessary that the feeded fibers are not twisted in too soon. This is prevented by a twiststop in the nozzle. The execution of the twiststop could have an effect on the yarn structure so that it can be assumed that the yarns of both machines show minor differences in the yarn structure and therefore should not be mixed in the subsequent processing.

The 120 spinning position of this Rieter J20 machine can be operated with a delivery speed of 450 m/min. A high flexibility implies that through the possibility that the two machine sides can be run with different velocities and air pressures. The concept of this machine reminds of a rotor spinning machine and requires less floor space in comparison to the Murata air spinning machine. With this machine in the portfolio Rieter now is supplier of all spinning processes available on the market, and therefore is capable of advising the spinner regarding their requirements relating to the end article.

Murata showed the new, strongly revised MVS 870. The basic concept was maintained. Now with a maximum of 96 spinning position a delivery speed of up to 500 m/min is indicated. To achieve this, modifications in the nozzle geometry were necessary, where also the yarn values were improved. The most significant attribute is the omitting of the delivery roll after the spinning nozzle. In front of the winding is a

new yarntension sensor that in combination with the yarn clearer detects unfavorable changes in the yarn structure due to disturbances in the spinning nozzle. Both draw system rolls at the draw system entrance are now also individually driven so that the machine can be optimally be adjusted to certain raw materials.

The market more and more asks for cleaner yarns. Uster Technologies presented the USTER QUANTUM 3 clearer which defines the yarn body more exact and especially faster and can reliably detect and clean out all yarn faults correspondingly. After only two minutes the yarn profile of the real yarn can be depicted. In an individually determined interval a cleaning curve can be adjusted to the yarn body. This limitation curve separates the tolerance range from the area of the rare defects, which then were cleaned out. The usual classification in different classes such as with the Klassimat is no longer required, so that unnecessary cuts can be prevented and also the required cuts can be determined individually according to the end article. The use of the USTER QUANTUM 3 will contribute to a noticeable increase in productivity.

Three companies have dealt with the subject of „Spinnit“. Mayer & Cie, Pailung und Terrot introduced this new process. It is about a process shortening through the combination of spinning and knitting in one machine, which means that it runs without the winding process and the logistics between spinner and knitter. A running machine at Mayer & Cie found great interest at the ITMA.

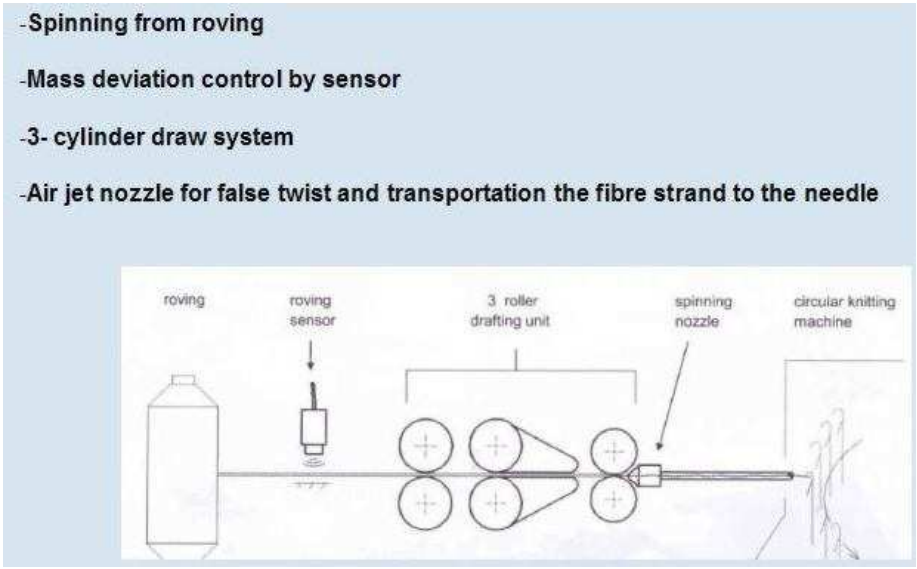

Fig.: 4 „Spinnit“ End article

Here you can see the principle of the Spinnit process. It can be spun either from sliver or from the roving. In this example it is spun from roving. The 3 cylinder draw system is set up modularly and owns a suction against fly. After the front roller a false twist is given through a twist nozzle onto the drafted strand, to transport the fiber mass to the knitting needle. A yarn clearer cannot be used, therefore it is tried to detect and then clean mass irregularities before the draw system.

As only a false twist is created on the air nozzle, the twist is released just at the knitting needle, so that a fibre strand from parallel fibres is knitted in. A conventional yarn is not spun; fibres are only held together by knitting points in the loops of the knitting. The end article from a “Spinnit” knitting offers an for a knitting important bigger volume, a softer grip and higher shine due to the new yarn structure. This although has to be bought by the use of raw materials with higher quality, which needs to be combed.

If this development will become a success, depends on whether the spinner is willing to quarrel with knitting or if the knitter wants to learn how to spin. Through the combination of spinning and knitting, directly connected in series, a yarn cleaning cannot be executed anymore. All knitting systems stand still at a yarn break. The quality of the end article with the really new yarn structure is convincing, so that with the advantages through the reduction in process steps, the product can be a success. As we have seen by the compact spinning, this process still can take a long time.

The ITMA 2011 has shown that despite the high state of development there still can be large steps in the development that offer the spinner an additional value. We hope that these innovations will also be acknowledged by Asian customers so that in future these innovative enterprises will have the potential for further progress.