Bystronic

WORLD

The magazine for cutting, bending, and automation

03-2021

ROUND REVOLUTION

HOW THE CIRCULAR ECONOMY WORKS

STAINLESS STEEL SUCCESS IN SOUTH AFRICA

SWISS TIMEPIECES WITH A DIFFERENCE

BACKSTAGE LAB: EVENTS IN LINE WITH THE TIMES

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"We are in the same boat as our customers."

Karsten Trautvetter, Head of Experience Center Gotha and the initiator of the Backstage Lab

Dear reader,

To date, the traditional approach of the manufacturing industry was not based on sustainability. Products were manufactured with a set lifespan in mind, and most of the valuable raw materials ended up in landfills. A fact that the circular economy is intended to change. Bystronic has already found a number of ways to return raw materials to the cycle. We utilize recycled materials and give secondhand machines a new lease of life.

The cycle is also something that motivates the Swiss artist Martin Fischer, but in a completely different way: In his metal workshop, everything revolves around clocks. The intricate parts for his ticking works of art are created using Bystronic laser cutting machines. The high precision of our systems ensures that the extraordinary pendulum clocks swing precisely in time.

One of South Africa's largest stainless steel processing companies also relies on the quality of our fiber laser systems. NSSC processes up to 800 tons of steel every month and has its long-term sights set on a smart factory. The South African market has long been high on our list of priorities. Now, almost every second laser cutting machine in the country bears the Bystronic brand. Two years ago we opened a regional subsidiary in Johannesburg in order to be able to provide our local customers with even better and faster support.

Wishing you an enjoyable read,

Alex Waser, CEO

Bystronic

IMPRINT

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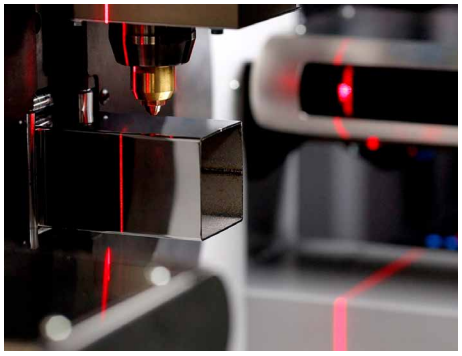
Bystronic

NEWS

Grand opening of our new Experience Center in the United States

At the beginning of 2020 the entire Bystronic USA team moved to our new headquarters for the Americas in Hoffmann Estates near Chicago. Since then, numerous existing and potential customers have already visited the spacious Experience Center. However, due to the pandemic, the opening ceremony had to be postponed for a long time. At the end of October, the day had finally come: The grand opening attracted visitors by showcasing our latest innovations, a tour of the plant, and with culinary delights.



The ultimate solution for tube processing

The ByTube Star 130 enables a simple entry into tube processing. With this high-end laser cutting machine, even open profiles and oval tubes can be processed with ease. The intelligent software and fully automatic setup guarantee speed and safety. The "Laserscan" option (see picture) automatically detects geometric deviations, ensuring cutting accuracy regardless of the quality of the raw material.

Cutting in the XXL format with the ByCut Smart 6225

Larger sheets, more variety: The ByCut Smart 6225 opens up new possibilities. The large cutting format of up to 6.2 by 2.5 meters provides plenty of room for large parts while also optimizing sheet metal utilization when cutting smaller parts. A laser output of up to 10 kilowatts ensures high productivity. And all this at an affordable price.

Bystronic demonstrates how successful export works

The "Swiss export day" is an important industry event for export-oriented companies in Switzerland. We are proud that Bystronic was chosen to share with other companies its many years of know-how in the global marketing of products. The first virtual edition of the conference was broadcast from our headquarters last year. This September, it was followed up by the best-practice section with a tour of our factory. Numerous companies took the opportunity to take a peek behind the scenes at Bystronic Laser AG.

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www.linkedin.com/company/BystronicGroup

www.youtube.com/user/BystronicBestChoice

www.facebook.com/bystronicgroup

Finally getting together again at the European Competence Days

Last year, the Competence Days had to be held virtually. All the more reason to take full advantage of being able to meet in person again this year. From September 6 to 21, we were able to welcome some 800 customers and account managers from 20 European countries to our headquarters in Switzerland. Our guests enjoyed the face-to-face interaction as much as we did. In addition to product innovations in the fields of cutting, bending, automation, and software, we presented our vision of the smart factory.

Welcome to our virtual showroom

Our Experience Center in Gotha can now also be explored digitally: Using an intuitive navigation system, visitors can take a tour of our virtual showroom via their smartphone, tablet, or computer. Detailed information and multimedia content is available for all products. Click in and take a look!

www.bystronic-showroom.de

Dangerous AI technologies

The United Nations has recommended that artificial intelligence technologies such as facial recognition software be banned – or at least strictly regulated. Until appropriate safeguards are put into place, they could pose a threat to human rights. In particular, the UN sees the right to privacy and freedom of movement and expression at risk.

Image: Climeworks

Good for the climate

Iceland: To help slow down climate change, a system from the Swiss startup company Climeworks filters CO_2 directly from the atmosphere. Subsequently, the CO_2 is mixed with water and injected into basalt at a depth of 1000 meters. There, it fossilizes within just two years. The technology thus replicates the natural mineralization process, which normally takes several thousand years.

Living in a closed loop

To test new, recyclable technologies and materials in a real-life environment, the Zurich University of Applied Sciences (ZHAW) has built a house in the spirit of the circular economy. Rainwater is turned into drinking water, excess solar power is stored in old batteries, and wastewater is used for irrigation. Even the occupants' urine is not wasted, but used as a source of nutrients to fertilize the garden.

Image: ZHAW

Image: Keystone

Robots lend a helping hand

The older the population becomes, the more likely that robots fill the gaps in the job market. This is the conclusion of a study conducted by MIT and Boston University. Thus, robots and other automation systems are gaining ground, particularly in industrialized societies where a large proportion of the workforce is over 56 – for example in Germany or South Korea.

Image: Keystone

Color as an early warning of material failure

The more lightweight, the better: Among other things, this applies to vehicle, aircraft, and ship engineering. In addition to lightweight metals such as aluminum, composites are increasingly becoming the norm. Because these new materials have not yet undergone extensive testing, methods are needed to detect potential failure at an early stage. Researchers at the Swiss Federal Institute of Technology (ETH) in Zurich and the University of Fribourg have now developed a material that makes critical internal deformations visible: If cracks or fractures are imminent, their innovative new laminate changes its color.

Downtown Johannesburg. South Africa's largest city stands for vibrant culture and diversity.

Jo'burg: Land of opportunity

Johannesburg is South Africa's economic powerhouse. The lively city is not only a cultural breeding ground, but also the perfect base of operations for entrepreneurs such as Mischel Frljak. With his company National Stainless Steel Centre, the charismatic Managing Director has risen to the top of the region's sheet metal processing industry and is setting new standards.

Story and photography: Stefan Jermann

Johannesburg – often abbreviated as Jo'burg – is also known as Egoli, which means "city of gold" in Zulu. 130 years ago, the first nugget was found on a mountain range north of Johannesburg. Soon after, adventurers came in droves. Today, the gold sources are long since exhausted, but the city still exerts a power of attraction. Johannesburg has become South Africa's economic powerhouse with a current population of roughly 5.5 million, and its growing steadily.

"The more efficient you are, the more opportunities you can create."

Mischel Frljak, founder and Managing Director of NSSC

The headquarters of National Stainless Steel Centre (NSSC) are located at the northern end of town, where the grey suburban sprawl gives way to green fields. About 15 miles from the busy city center, the landscape quickly takes on a rural appearance. Just as downtown, where business districts are situated next to the Apartheid Museum or the MOAD (Museum of African Design). On the other side, the scenery on the outskirts is characterized by contrasts: There are luxury estates and golf courses, but also townships and abandoned mines.

The humble beginnings of a success story

Mischel Frljak ushers us into an impressive boardroom, which could easily compete with those of any blue chip company. There, the energetic founder and Managing Director of NSSC tells us his story: Born to Croatian parents in Rüsselsheim, Germany, Mischel immigrated to South Africa when he was five. "Somehow, my parents believed there were opportunities to be found in Johannesburg," he says. And they were right. 45 years later, Mischel has remained true to South Africa and calls it his home.

Mischel has a background in the trades, and has been working in the steel industry for many years. About 15 years ago, he and his Croatian-born business partner Ivan Obadic decided to found their own company. They started out with a handful of people and around 1500 square meters of production space. Mischel recalls: "We literally did everything ourselves, from the shop floor to procurement." Business prospered, and soon the company started pursuing a new business model: "We understood that we had to move towards value-added production. So we started offering our services as a one-stop shop."

While in essence the company is a provider of stainless steel processing services with a broad expertise ranging from laser to high-definition plasma and waterjet cutting, they also offer CNC tube bending, plate rolling, polishing, and CNC machining. During its first five years, the company quadrupled both its turnover and workforce, and moved to new, larger premises. Mischel and his partner then leased three separate factory halls, the coordination of which, however, turned out to be quite a challenge, so they decided to

The BySmart 3015 3kW fiber laser with the ByTrans Cross automation solution helps speed up the vast production volumes.

move into one big factory instead. Their current premises cover 24,000 m² including a 13,000 m² shop floor. "Since we didn't want to have to move again soon, we made sure we have enough space for long-term growth," says Mischel.

Teaming up with Philipp

The steel industry plays an important role in South Africa's economy, and sheet metal processing is booming. An estimated 500 laser cutting machines are in operation throughout the country. Philipp Burgener, Bystronic's Managing Director South Africa and Switzerland, knows the local market well. He is proud that almost half of these machines bear the Bystronic brand, and he sees even more potential: ▶

The founding business partners of National Stainless Steel Centre, Mischel Frljak and Ivan Obadic.

"We understood that we had to move towards value-added production. So we started offering our services as a one-stop shop."

Mischel Frljak, founder and Managing Director of NSSC

"Our regionalization strategy enables our local subsidiaries to respond directly to the needs of their markets, and there are many optimistic entrepreneurs in South Africa with demanding requirements."

Mischel Frljak, is one of them. The partnership between National Stainless Steel Centre and Bystronic started six years ago. "Philipp Burgener has had a massive impact on our company," says Mischel. "He invited us to Switzerland, showed us how Bystronic manufactures its machines, and made us feel at home there. At that time, we realized that with the machines we intended to purchase, we would have excess capacities, but we were optimistic about the future, so we invested anyway." But why Bystronic? The Managing Director explains that one of the main reasons for their choice was the Swiss sheet metal specialist's fast and reliable maintenance service.

To fully utilize the efficiency of his new Bystronic laser cutting systems, Mischel decided to also venture into the retail business, which acts more as a filler for the rare times when the laser machines are not being used at full capacity. Over the past few years, an entire range of retail products has emerged: from fire fryers to outdoor "braai" pans and from house numbers to key hangers. The products are sold directly to retail outlets or via the company's own website.

Hundreds of tons of stainless steel every month

The amount of steel processed by the company is impressive. In some months it exceeds 800 tons. With the ByStar 10kW and the BySmart 4kW they recently purchased, together with a ByTrans Cross loading and unloading automation solution, National Stainless Steel Centre took another major leap forward. They are now one of South Africa's top three stainless steel processing companies. Driving forward automation was a conscious strategic decision, Mischel explains: "The more efficient you are, the more opportunities you can create."

Skilled labor, which is essential to operate the wide variety of systems in the factory, is hard to come by in South Africa. Most of the workforce needs be trained first. NSSC is one of only a handful of companies in South Africa that have obtained certification as an official training center and can thus offer full practical apprenticeship training courses. "With this training program, we also want to give something back to society," Mischel says.

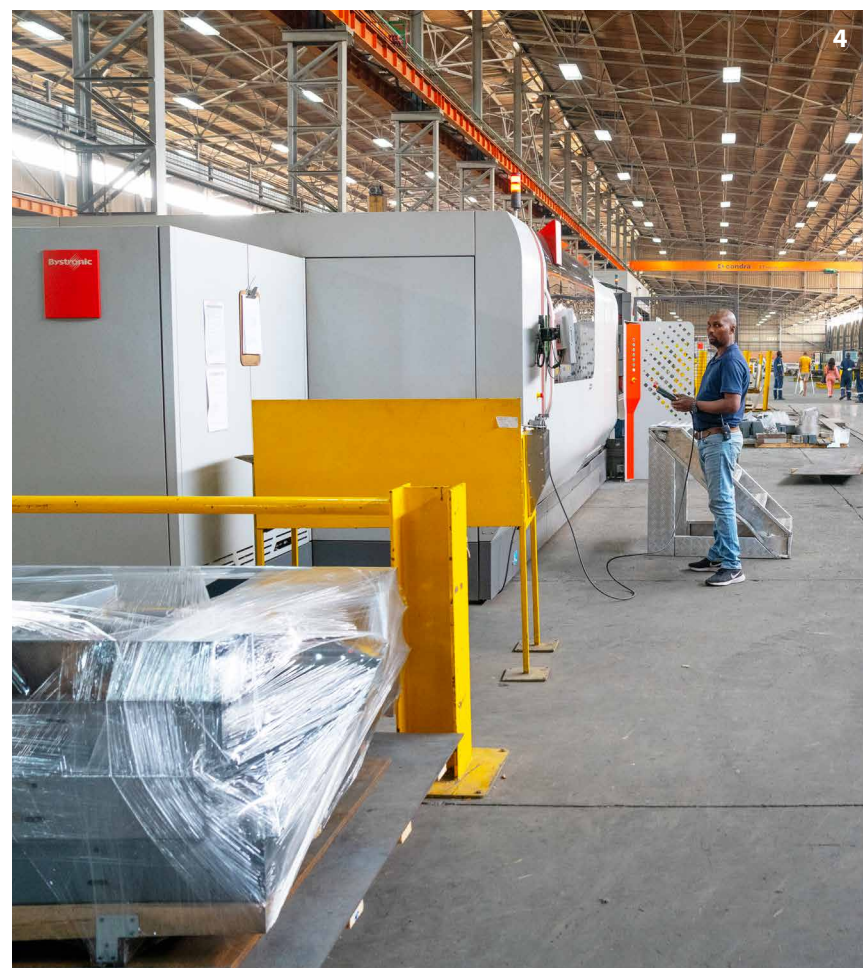
In addition to the domestic market, international business is gaining in importance for the company. NSSC is active throughout Africa, and there are even some projects in Australia, Russia, Europe, and the United States. To stay one step ahead of the competition, Mischel has his sights set on a smart factory and is ▶

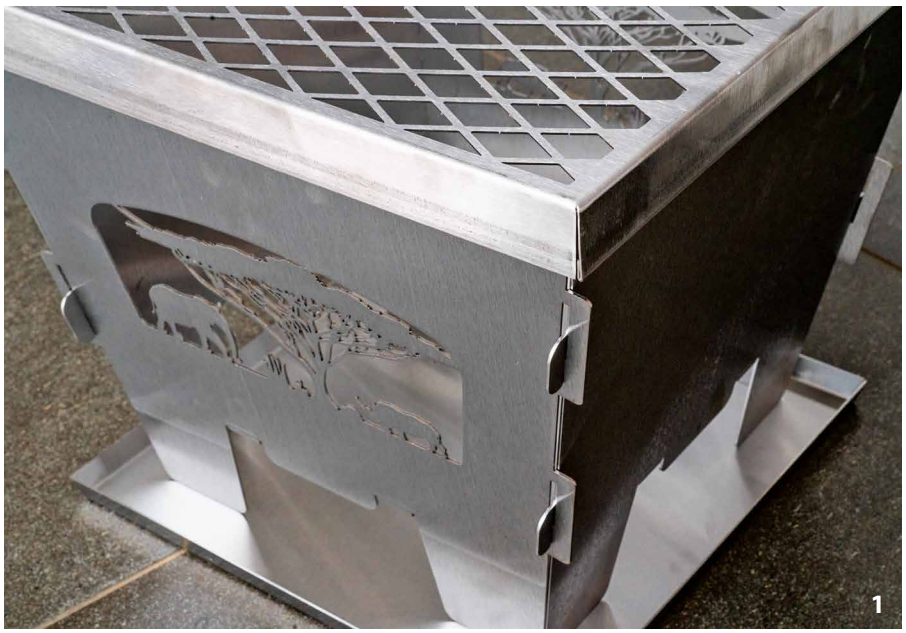
1 *The 10kW ByStar Fiber laser cutting system dramatically boosted NSSC's production capacity.*

2 *No job too big: These doors are manufactured for trains.*

3 *Stainless steel "Fire Fryer" braai pan, cut and ready for bending. Sold into the retail industry such as Massmart stores (Walmart Group).*

4 *This enormous production hall is now home to two state-of-the-art Bystronic laser cutting systems.*





1 *This fire-fryer grill is one of NSSC's own products and can be assembled in next no time.*

2 *A true success story: The founders of NSSC in front of their headquarters with the striking orange branding.*

pursuing several digitalization initiatives focusing on tasks such as log and capacity tracking, procurement, and the entire supply chain management. Mischel is driving this forward with the help of various partners in order to create an integrated ecosystem and has also adapted the business processes to conform with international standards. The Bystronic Plant Manager software is a first step in this direction, introducing end-to-end shop floor management.

Human-centered and eco-friendly

One of the reasons for National Stainless Steel Centre's investments in new equipment is that they want to become more energy efficient, sustainable, and eco-friendly. To reduce their carbon footprint, they produce the nitrogen for the laser cutters themselves on-site. But they are also reducing their power consumption, among other things by splitting up shifts. During the Covid crisis, the company further increased these efforts in order to save costs. NSSC managed to remain operational even during the most difficult months of the pandemic. Now, the factory is regularly running 24/7 again.

"You have to focus on what you do best, because that's what makes your business successful."

Mischel Frljak, founder and Managing Director of NSSC

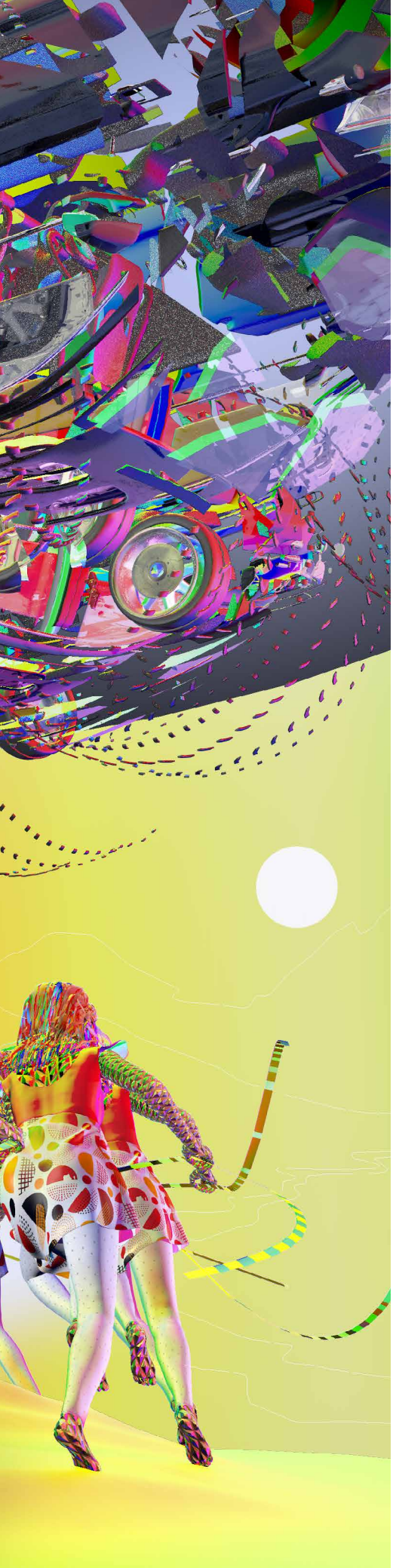
One thing Mischel is very proud of is their open management culture: Everybody can approach the management with ideas and suggestions, and they invest a great deal to create a positive working environment. Given the close to 60% unemployment rate in South Africa, the company offers its staff rare opportunities. Mischel elaborates: "Despite the rather difficult economic situation of our country at the moment, we are doing very well, because we operate in a niche market. Plus, we are very versatile, as we provide services to many different industries."

Mischel is optimistic that his company will continue to make headway on the African markets. With reference to the current surge of investments by Chinese companies on the continent, the Managing Director says he welcomes healthy competition: "You have to focus on what you do best, because that's what makes your business successful. My main goal for our company is to further improve our ability to offer our customers high quality at affordable prices, so they can stay competitive as well." ■

PROFILE National Stainless Steel Centre (NSSC)

Fields of business: Steel processing using laser, high-definition plasma, and waterjet cutting, CNC sheet metal bending, CNC tube bending, plate rolling, polishing, and CNC machining
Employees: 135
Headquarters: Johannesburg, South Africa
Customer since: 2015

www.nssc.co.za



All things have an end, except the circle

Single use and then off to the dump: Our linear economic system consumes vast amounts of finite resources. A fact that the circular economy is intended to change. For the mechanical engineering industry, this paradigm shift represents a challenge, but also an opportunity – mainly in the form of new business models.

Story: Bettina Bhend Illustrations: Justin Wood

The circular economy has hit the mainstream. In the fall of 2021, BMW unveiled the world's first fully recyclable car. But it does not come with the German automaker's typical flourishes and flamboyant details. BMW itself calls the design of its "i Vision Circular" monolithic. Only the champagne color of the bodywork conveys a touch of extravagance.

The car is made of 100 percent recycled and regenerative raw materials. The number of components has been drastically reduced, as has the use of composite materials. Wherever different materials come into contact with each other, they are connected using pins and screws. This means that they can be easily replaced or separated and reused when the car is scrapped.

BMW is taking the circular economy seriously. The "i Vision Circular" is not merely a design study, but a symbol of a new mindset and the basis for BMW's upcoming generations of models starting in 2025

What is the circular economy – and what isn't it?

Circular economy is not a dream of the future. Its underlying ideas – inspired by the natural cycle – are centuries old and can be found, for example, in traditional agriculture. In its modern form, geared toward industrial production, the circular economy emerged roughly 30 years ago. The key idea: Using finite raw materials for single-use products makes no sense. Its two maxims: Firstly, material cycles should be slowed down, i.e. products should be designed for longevity and repairability. Secondly, material cycles should be closed, i.e. materials should live on in new products.

Michael Braungart is a pioneer in the field of the circular economy. The chemist and process engineer has been researching and lecturing on the subject for over 20 years. He regularly shines a light on circular economy projects – and debunks what is known as "downcycling". He says: "Shredding used plastic bottles to make park benches is not circular economy; at best, it is the temporary reallocation of the landfill." The same holds true for metals: If the 46 different steel alloys in a scrapped car are ultimately turned into "primitive" rebar for reinforced concrete, valuable raw materials end up being lost forever.

The formula: use, not own

So, simply recycling a material once is not enough to keep the cycle going. It takes the consistent re-use of materials – in the form of products that are explicitly designed for the cycle. BMW's "i Vision Circular", which was designed for recyclability from the outset, sets a good example in this respect. But pioneers like Michael Braungart are convinced: There is more to the circular economy than the aspect of materials. It's also about how products are used. The formula is "use, not own".

Michael Braungart argues: "Customers do not need a smartphone or a car. What they actually want is communication and mobility." Consequently, companies should develop business models that focus on using rather than owning. In doing so, they not only meet a customer need, but also serve their own economic interests.

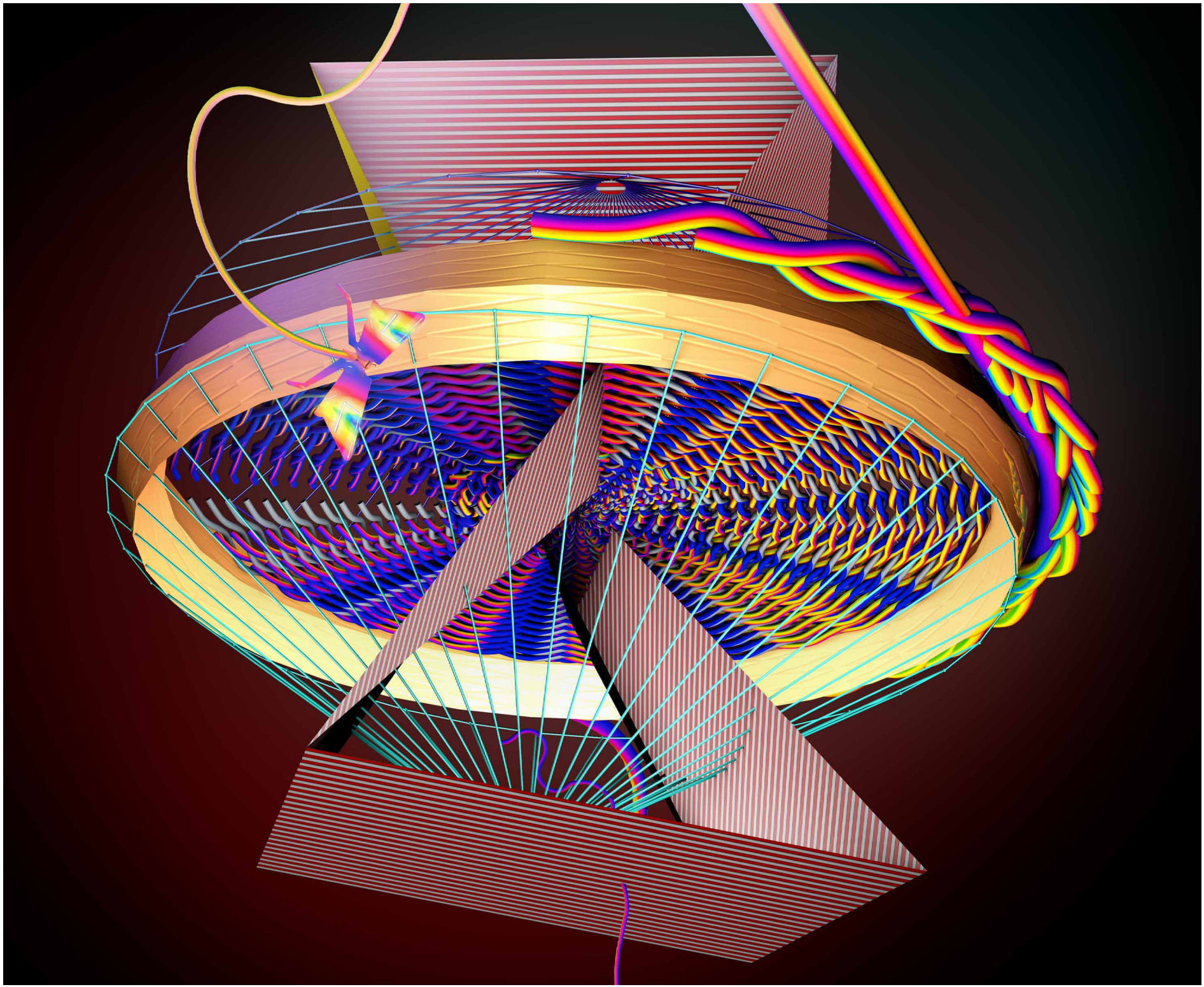
"Only a few months after a company launches a product on the market, they find themselves competing with cheap knock-offs," Braungart explains. This cranks up the consumption of raw materials even further. With a business model that focuses on using, there is no such danger: Manufacturers generate income from usage and service contracts and it is in their own interest to produce particularly high-quality, durable, and – not least – recyclable products.

Upgrade and repair to slow down the cycles

These mechanisms also apply to the engineering industry. Christine Roth, head of the environmental unit at Swissmem, the Swiss association of mechanical and electrical engineering industries, says: "In the future, service-oriented business models will play

"Shredding used plastic bottles to make park benches is not circular economy; at best, it is the temporary reallocation of the landfill."

Michael Braungart, chemist and process engineer



a major role." Primarily, she is referring to improved repairability, upgradability, refurbishing, and maintenance. "This doesn't close the material cycle, but it at least leads to a longer machine service life, thus slowing down the cycle." In the long term, the trend is moving toward "product as a service": The customer no longer buys the machine, but only the right to use it, including maintenance and repairs.

Information and technology

As important as business models revolving around maintenance and service may be: The mechanical engineering industry must also embrace the systematic recycling of materials. There are two aspects that are key to achieving this: information and technology.

Firstly: information. Christine Roth explains: "To enable more comprehensive recycling, you need to know where which materials are used – a major challenge throughout the entire supply chain." The more complex the products are and the more internationally networked a company is, the more effort it takes to ensure that this information is shared. But even when this effort is undertaken, the disclosure of materials and compositions is controversial. Many companies still view this information as a trade secret.

Secondly: technology. Recycling materials requires efficient technologies. This is particularly true when it comes to composites or auxiliary materials. Christine Roth provides an example: "We add an auxiliary to a material to make it more elastic. This makes it more durable, which is an explicit requirement of the circular economy. But when we come to recycle the material, we realize that the additive is detrimental to the new product." If you don't add the auxiliary, the original component is less durable – and if you continue to use it, you reduce potential subsequent uses for the material.

These conflicting goals must be resolved. This may not require the complete squaring of the circle, but it does call for innovations in many different areas: the responsible use of raw materials, research into new materials and recycling technologies, new business models – and, last but not least, customers who are willing to embrace and benefit from the circular economy.

CIRCULAR ECONOMY: KEEPING RAW MATERIALS AND PRODUCTS IN THE CYCLE

The circular economy differs fundamentally from conventional production processes. In our current linear economic system, raw materials are mined, products are manufactured, sold, consumed, and then thrown away. This leads an ever decreasing availability of raw materials, to emissions, vast volumes of waste, and to the associated environmental pollution.
In the circular economy, by contrast, products and materials are kept in circulation. As a result, it requires fewer primary raw materials compared to the linear economic system. In addition, products devalue less quickly, and less waste is generated. (Source: Swiss Federal Office for the Environment, FOEN)

"We provide our customers with the tools they need to more effectively process recycled materials."

Christoph Rüttimann, Chief Technology Officer Bystronic Group

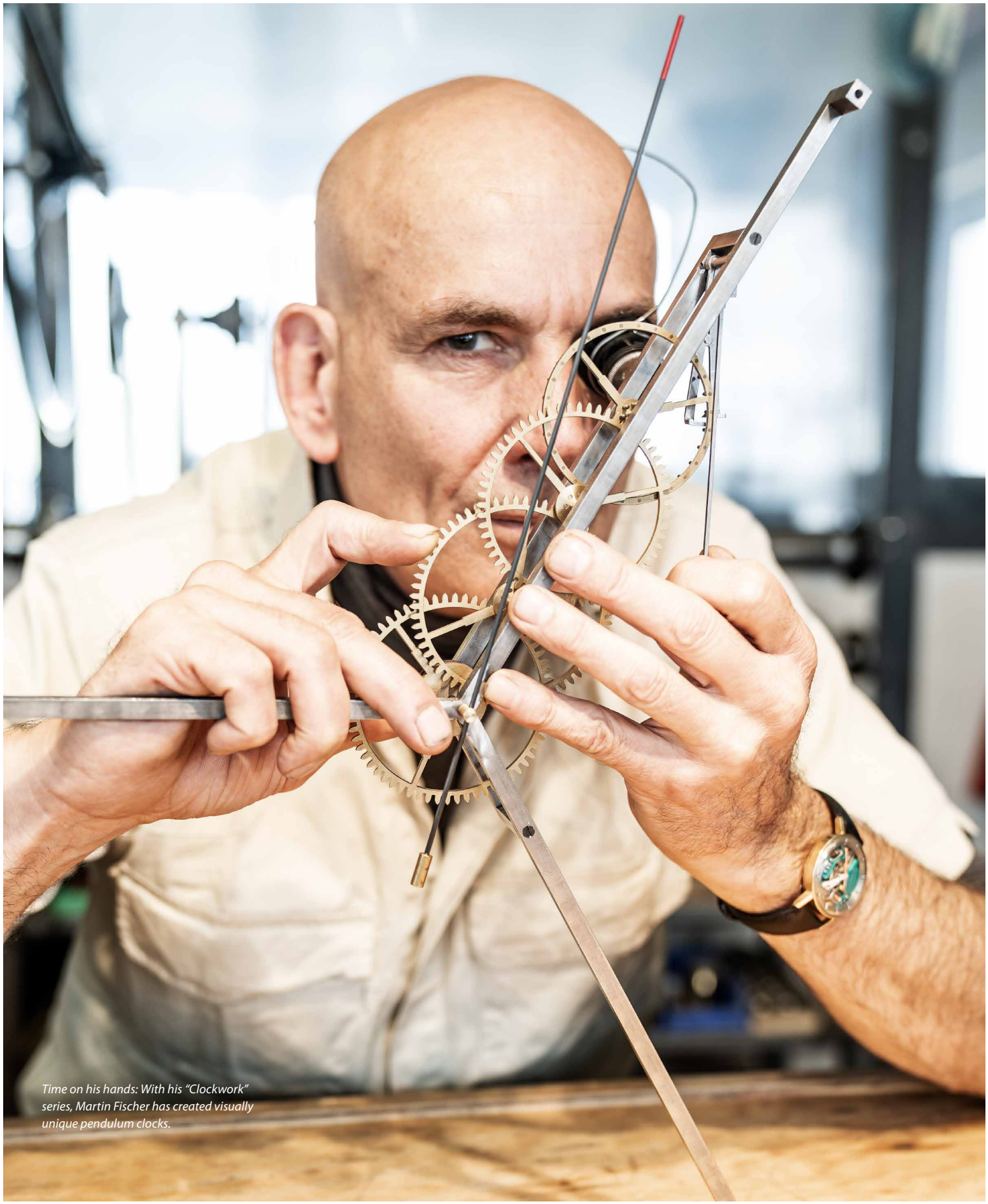
An interview with Christoph Rüttimann, Chief Technology Officer Bystronic Group

What does Bystronic do to extend the service life of its machines?
We design robust machines that can be operated reliably around the clock. Generally they are in operation for 10 years, sometimes even for 20. Accordingly, we attach great importance to servicing. Thanks to our maintenance, our machines still run optimally after many years. We also have three refurbishing centers. There, we refurbish secondhand machines, among other things by replacing CO_2 lasers with fiber lasers, which are significantly more energy-efficient.

Does the circular economy already play a role during the development of the machines?
Yes. We used to offer many different types of machines. Over the past few years, we have reduced this complexity – moving towards standardized platforms that are equipped with a range of options to suit the customers' specific requirements. We are thus pursuing a modular approach and keeping the number of parts as low as possible. This not only speeds up assembly and makes production more cost-effective, but also facilitates maintenance and repairs. For example, it is easier for service technicians if all Bystronic machines have the same control.

Talking about servicing: What is the significance of service models for Bystronic?
The expansion of the customer service business is one of our strategic priorities. In our industry, the pressure on margins is constantly increasing, and the service business helps us offset this. I can imagine that in the future, we will also start offering "pay per use" models. The customer no longer says: I want this machine. But rather: I want to produce a certain number of parts at a certain price.

Not only extending cycles, but actually closing them – is this already a topic at Bystronic?
On the one hand, some of the materials for our machines are recycled. On the other, we provide our customers with the tools they need to more effectively process recycled materials themselves. The composition and properties of recycled sheet metal vary from supplier to supplier and even from batch to batch. This has to be taken into account when adjusting the laser parameters. We offer our customers an AI-based solution that reliably guides them to the optimal parameters based on just a few test cuts. ■



Time on his hands: With his "Clockwork" series, Martin Fischer has created visually unique pendulum clocks.

Tricky parts. Or how to explore the limits of the possible

The precision mechanic Martin Fischer skillfully navigates between the worlds of metalworking and art. His passion: designing and manufacturing elegant pendulum clocks, for which he requires high-precision parts. These are cut by the Swiss job shop Al-Cut using a Bystronic laser cutting machine. A visit to the curious metal workshop of a creative mind.

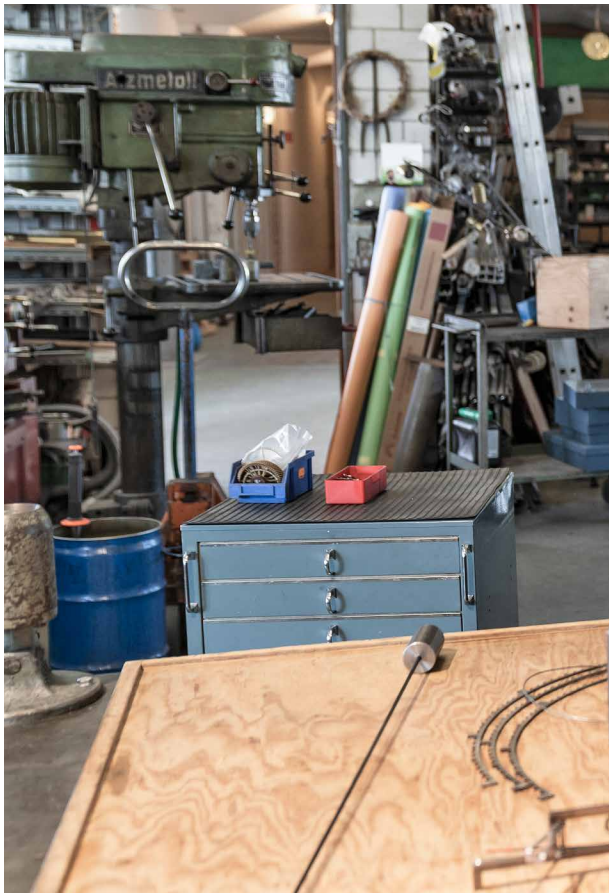
Story: Jan Graber Photography: Stefan Jermann

The bell rings loudly, brightly, and expectantly, as if someone had just rung the bell on an oversized door beckoning to be let in. The distinctive tone, however, merely signals the full hour and comes from one of the many clocks that are ticking away in Martin Fischer's metal workshop. "Once upon a time, I wanted to become an artist," he says with a smile that is as mischievous as it is reserved; a golden incisor flashes. "But I was pretty unsuccessful." That is why, he says, he eventually returned to metalworking – or rather, to somewhere in between. Fischer is a wiry, athletic, and bald-headed man with striking facial features and an intensely scrutinizing, yet always open and friendly, gaze. And he has a distinct can-do attitude: He runs a metal workshop at "Gleis 70" in the outskirts of Zurich – an artists' and craftspeople's cooperative that wouldn't exist without the 61-year-old.

His workshop is brimming with objects of various origins. The large room overlooking the tracks of the Zurich rail yard is littered with lathes, drilling and milling machines, workbenches, welding equipment, and stockpiles of steel profiles, tubes, and rods. Years of metal dust have turned the concrete floor a cloudy black, and the air smells of iron, machine oil, and burnt iron filings. A bicycle and the legs of an old mannequin are hanging on one wall, traffic signs and other bizarre objects on another. A small disco ball is dangling in one corner above a holey tin rabbit on a rail, which has apparently already been hit by several air rifle pellets. Fischer's sunny office is also home to many eye-catching objects. Next to his desk, an ultra-precise master clock is ticking away, serving as a reference timekeeper for all the other clocks in his workshop. Countless hunting trophies peer down from a wall above the glazed entrance; they were originally intended for a culinary event, which never took place – at least not yet.

Catching the horological virus in a watchmaker's factory

Three precisely manufactured pendulum clocks on the wall also draw the eye. The delicate metal objects with their exposed movements were designed and manufactured by Fischer from scratch. They bear witness to his striking flair for minimalist design; the clocks are second to none in terms of elegance. The most recent model – the "Clockwork 2.00B" – consists

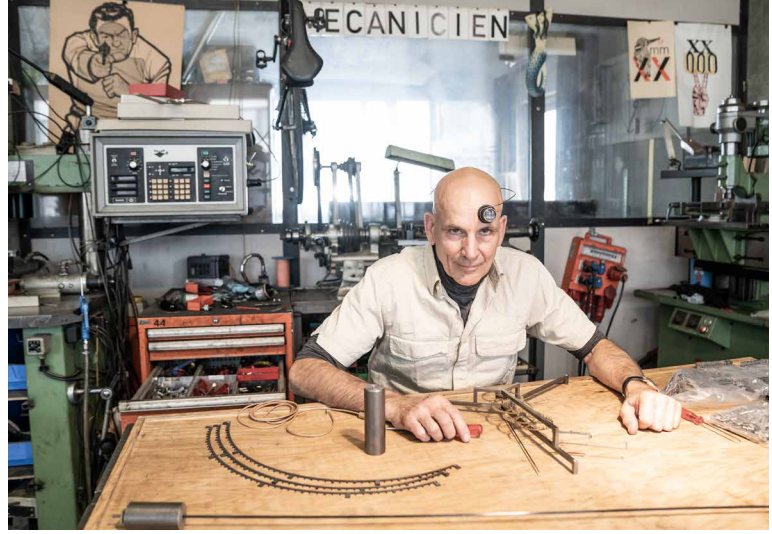


HOW THE "CLOCKWORK 2.00B" PENDULUM CLOCK WORKS

Almost five months of development work and 115 components went into Martin Fischer's latest clock – the "Clockwork 2.00B", a do-it-yourself kit with a limited production run of 200 units. The manufacturing of the clock parts and the pre-assembly take about two days. Fischer uses mild steel for the frame, the weight, and the anchor fork, brass for the cogs, leather for the winding strap, carbon for the pendulum rod, and CK45 steel for the escapement.

The movement consists of just three cogs and one escapement wheel. The weight (which stores the energy) drives the slowest cog – the hour wheel – via the winding mechanism. The rotation is transmitted via the intermediate cogs to the fastest wheel, the escapement wheel. This in turn drives the pendulum, which is connected to the anchor fork. Via the escapement, the swing of the pendulum causes the escapement wheel to stop and then continue moving. When the escapement wheel stops, the other cogs and thus the hour wheel, which moves the hour hand, also stop. In this way, the hand advances in a precisely coordinated cadence; the clock does not have a minute hand.

The "Clockwork 2.00B" costs 2,500 Swiss francs and must be assembled by the customer. Martin Fischer even offers his customers clock assembly workshops.
www.clockwork.ch



of only four interlocking cogs, a pendulum, a weight, and an escapement* consisting of the pallets and the pallets fork (see box).

Fischer caught the horological virus in 2006 when he bought a building in the Swiss Jura region that used to be home to a small watchmaker's factory. Driven by his curiosity, Fischer began to study how clocks work, learned about medieval verge escapements, and ultimately decided to try his hand at engineering a chronometer himself. "It took me quite some time before I figured out how to perfect the geometry of the escapement," Fischer says. He probably wouldn't have succeeded if not for a mentor who initiated him in the secrets of watchmaking. But once you get the hang of it, the rest is really just about precise metal-working, he says.

Change of scene. An industrial neighborhood in Inwil on a bright late September morning. The laser and waterjet cutting specialist Al-Cut is bustling with activity. Employees sit in offices in front of screens, walk over to the shop floor, and return with plans and spreadsheets: in short, the buzzing atmosphere of an industrial metal processing company. Toni Räber, the company's founder and Managing Director, is a ▶

"I love developing new ideas. And I like to push myself beyond my limits in order to expand my spectrum."

Martin Fischer

* The escapement is the link between the pendulum and the cogs of the clock. It inhibits (stops) the rotation of the first wheel, which is driven by a weight, at precise intervals by means of an anchor fork, and thus functions as the clock's timekeeper.

One of Martin Fischer's missions is to "squeeze efficiency out of outdated machinery".

stout figure with a mottled gray beard, an alert gaze, and the bearing of an actor. He is who Martin Fischer turned to for the cutting of the components for his clock escapements. We walk through the Al-Cut's large factory hall, which houses laser and waterjet cutting machines the size of single-car garages. "We have a whole range of Bystronic machines," Toni Räber says as we stop in front of a ByStar Fiber 3015. They include three laser cutting systems, two waterjet cutters, and two press brakes (see box). "We are also testing prototypes from Bystronic," Räber says with visible pride, as he leads us past an impressive metal warehouse back to the reception area and a display case showcasing sample parts. He points to a tiny bicycle, just two millimeters in length, on which a magnifying glass reveals all the details such as spokes and pedals. "Lasers allow us to work with incredibly high precision, even at the smallest of dimensions," he says.

Exploring the limits of the possible

However, the precision of the machines is not the only reason why Martin Fischer relies on Al-Cut for his clock components: It is also due to Toni Räber's willingness to tackle challenging jobs and work together with customers to find solutions to unusual problems – for example with regard to the heat resistance of metals during the cutting process. "I really enjoy working together with customers like Martin Fischer in order to push the envelope," he says. For Fischer's clock escapements, for example, they first had to find the correct material. Toni Räber calls them tricky parts. They finally settled on CK45 steel, because it can be hardened after machining, in order to minimize wear in the clock movement.

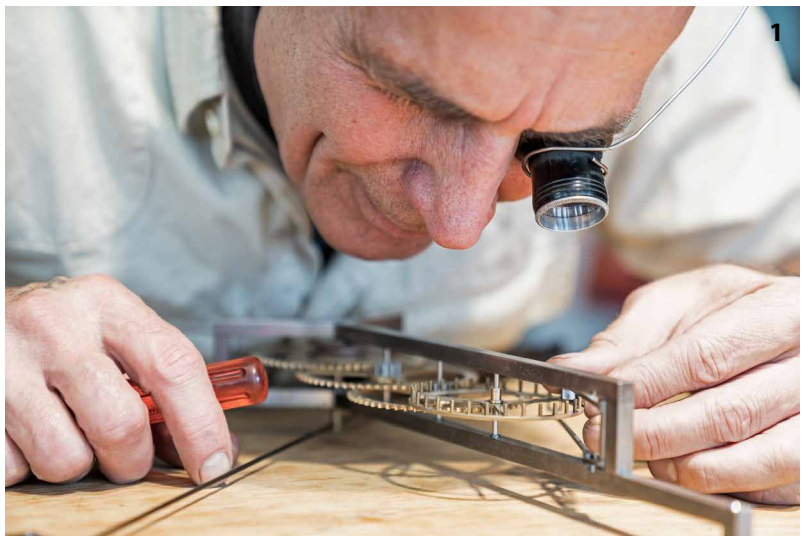
"I really appreciate Toni Räber's understanding of materials and how he thinks ahead," Martin Fischer says. Back in Fischer's workshop in Zurich, he serves up a strong espresso. "I enjoy collaborating with other people, especially with artists who approach me with challenging projects. I love developing new ideas. And I like to push myself beyond my limits in order to expand my spectrum," he says. That's why, he explains, he didn't immediately start working in industry after completing his apprenticeship as a polymechanic, but traveled to London to learn English. There he got to know the glass and steel artist Danny Lane, started working as his assistant, and thus first came into contact with the art world. "This experience made me want to become an artist myself," he says. Somehow, he found his way to Tuscany, where he helped set up an art school, and then to Milan, where he tried his hand at being an artist for a year. "Absolutely unsuccessfully," he says with a chuckle. Back in Zurich, he started doing mechanical jobs and scenery construction for a renowned theater as well as for film and theater producers – he found his way back to metalworking and a niche between the creative and the industrial world.

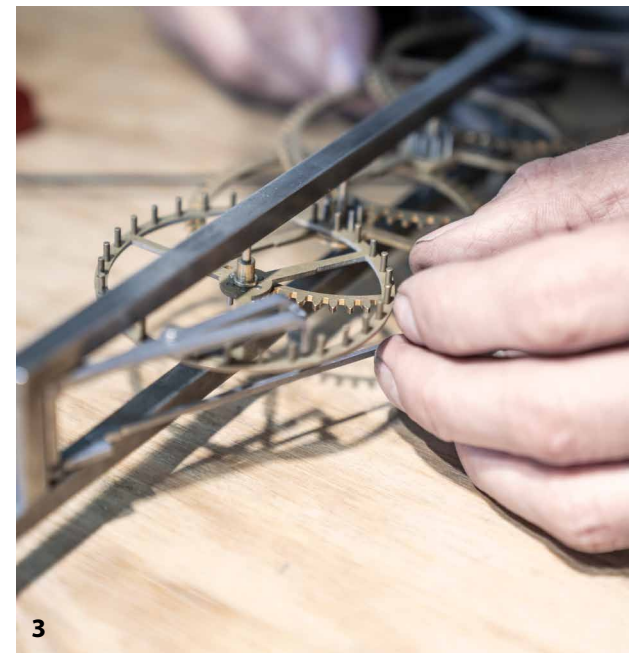
Accordingly, he is not only involved in the mechanical work, but also in the creative process. He does welding jobs for museums and galleries, builds lights and luminaires, constructs furniture and, together with his wife, has designed several restaurant interiors. If required for a job, he also manufactures his own high-precision tools. His main expertise, he says, lies in metalworking methods. "But it's the hands-on tinkering that fascinates me most," he says with a mischievousness twinkling in his eyes. Together with friends, for example, he designed and built a bazooka to launch tennis balls or fireworks, which he calls "Fischerwerke": They are evocative of the "The Way Things Go" art film by the artist duo Fischli and Weiss. "I can spend hours experimenting," he concludes with a grin, whereupon the hour bell sounds right on time to mark the end of our conversation. ■

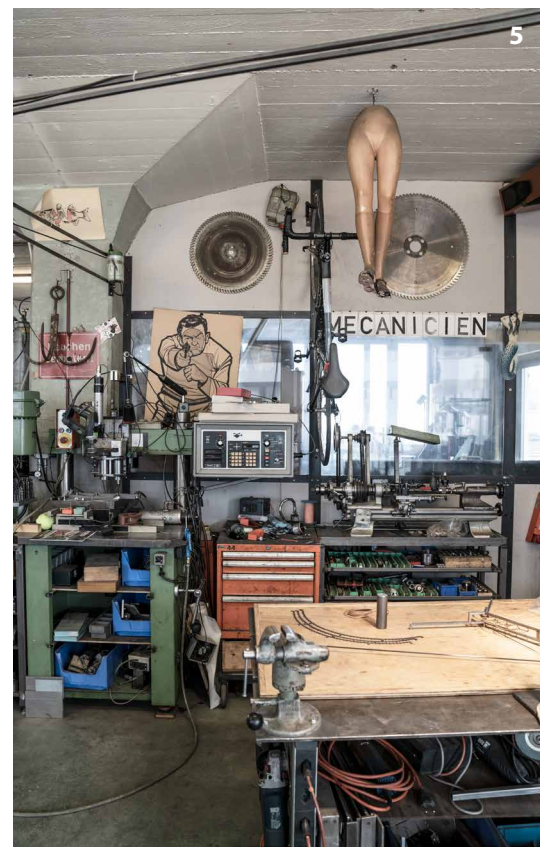
AL-CUT

Al-Cut AG was founded by Toni Räber and Andi Sommer in 2009 and specializes in laser and waterjet cutting as well as metal grinding and bending. Based in Inwil, Switzerland, the company has 17 employees and more than 500 loyal customers. Al-Cut is a close Bystronic partner that regularly helps out with the testing of prototype machines. In addition to wet grinding and leveling systems, a vibratory grinding machine (Trowal), and a deburring machine, Al-Cut primarily relies on Bystronic systems. Their fleet of Bystronic machines currently consists of:

- ByJet Flex (waterjet cutter)
- ByJet ProL 4030 (waterjet cutter)
- ByStar 3015 (6kW CO_2 laser)
- ByStar 3015 (6kW fiber laser)
- ByStar 6225 (10kW fiber laser)
- Xpert Pro 320 (press brake)
- Xpert Pro 40 (press brake)







1 *It took Martin Fischer quite some time to figure out the perfect interplay between materials, geometry, and high precision.*

2 *If necessary, the mechanic makes his own high-precision tools.*

3 *For some components of his pendulum clocks, Martin Fischer had to push the limits of the thermal stress the metals could withstand.*

4 *Martin Fischer next to his own collection of the "Clockwork" series.*

5 *Together with his wife, Martin Fischer also stages cultural and culinary events in his workshop.*

BACKSTAGE LAB

Topics such as sustainability, digitalization, and automation pose challenges for the sheet metal industry. With the Backstage Lab virtual event series, Bystronic is helping its customers to create more efficient and sustainable production environments.

Many companies want to make their production processes greener. But how should such an undertaking be tackled? In which areas can energy and resources be conserved? For which processes do more energy-efficient technologies pay off? And how can a sustainable digitalization and automation strategy be successfully driven forward?
The Backstage Lab shows sheet metal processing companies paths into a digital and green future. This hybrid event series is a new format in the growing range of digital events with which Bystronic is supporting its customers.

Sustainability in all its facets

The event series will take place for the first time in 2022 and can also be attended via a live stream. It will highlight a number of key topics, all revolving around factors that are critical to the success of sheet metal processing companies: from process optimization based on digitalization and automation right through to the responsible use of resources and the securing of subsidies for sustainable production facilities. Naturally, global trends will also be explored and discussed with experts. In addition, the Backstage Lab will offer insights into Bystronic's own approach relating to topics of the future, such as the digital transformation or its environmental, social, and governance (ESG) strategy. Bystronic CEO Alex Waser, product developers, and service engineers will present their perspectives. Live feeds are planned to Bystronic's business locations all around the globe. External companies and customers, with whom Bystronic maintains successful partnerships, will also give keynotes.

IN TUNE WITH THE TIMES
DIALOGUES ABOUT TOMORROW'S WORLD

Reduced emissions, increased efficiency

Just how much can be saved by means of energy-efficient processes is demonstrated by the AL-KO Vehicle Technology Group from Germany, a family-owned company with annual sales of around 700 million euro that has successfully asserted itself as a global player. The company has equipped its sites with a total of three state-of-the-art laser cutting systems as well as the latest software, storage, and automated sorting solutions. Thanks to this new infrastructure, they are saving more than 500 tonnes of carbon emissions every year. This is roughly equivalent to the CO_2 emissions of 90,000 cars in one day.

These numbers are impressive not only from an ecological perspective. If implemented correctly, enhanced sustainability also translates into higher profitability. Karsten Trautvetter, the initiator of the Backstage Lab, estimates that companies on the scale of AL-KO can achieve annual savings in the six-figure range, simply by making the switch to fiber laser technology and state-of-the-art automation and software solutions.

3 TIPS TO MAKE PRODUCTION MORE SUSTAINABLE

1. Utilize waste heat
The exhaust heat from many industrial systems goes to waste in the surrounding air. An increasing number of Bystronic customers are using the thermal energy of their cutting and bending machines to reduce the energy consumption of their production facilities. With the aid of heat pumps, the waste heat can, for example, be used for the heating or cooling of the shop floor. In addition, companies that generate their own electricity by means of a photovoltaic system can cover a large part of their energy requirements from their own resources.

2. Save resources
Fiber laser technology has made laser cutting substantially more energy-efficient. Advanced software ensures optimum utilization of the machines and reduces raw material waste during the cutting process thanks to intelligent nesting methods. Resources can also be saved when bending thanks to state-of-the-art hydraulic systems. For example, Bystronic's Energy Saver function only switches on the main motor of the Xpert press brakes when the machine is actually operating. This reduces the power consumption by up to 60 percent.

3. Generate your own nitrogen
Fiber laser systems require nitrogen to provide an oxygen-free environment for the cutting process, thus preventing oxidation. The disadvantage: The use of this gas incurs high operating costs. Instead of purchasing nitrogen from external suppliers, it can be produced in-house using a generator, ideally driven by electricity from the company's own photovoltaic system. This eliminates disruptions to production due to the exchange of gas tanks. And the even higher purity of the nitrogen also ensures higher cutting quality. Thanks to its partnership with the manufacturer Airco, Bystronic can offer its customers access to this technology.

INTERVIEW

"WE ARE IN THE SAME BOAT AS OUR CUSTOMERS."

Why did Bystronic launch the Backstage Lab?
During our interactions with our customers, we realized that there are many open questions relating to the topic of sustainability. There is a demand for a more in-depth clarification of concepts such as ESG and the smart factory. With the Backstage Lab, we want to offer simple explanations and show how production processes can be made more efficient in terms of resources and energy.

Where does energy go to waste in the sheet metal processing industry?
A great deal of energy is lost in inefficient processes. Increased transparency is already a giant step toward sustainability. Many companies waste time and resources because they do not know precisely where each part is located within the production process. Modern software provides a better overview, allowing resources to be optimally utilized. In addition, older systems are usually not very energy-efficient. Fiber laser cutting machines and latest-generation press brakes can save an enormous amount of energy.

How is Bystronic tackling the issue of sustainability?
Within the framework of our Strategy 2025, ESG criteria play a key role. We will continue to advance our organization in ecological and social terms and also actively embrace good corporate governance. Our experience in these fields is constantly growing, and we want to share this knowledge with our customers. Because we are in the same boat – since we also process sheet metal and have to drive our production towards sustainability. Conversely, there is great deal we can learn from our customers. The Backstage Lab is intended to promote this exchange.

What can our customers expect from the Backstage Lab?
We will demonstrate how sheet metal processing companies can prepare for the future in a pragmatic way. Participants will come away with concrete ideas on how they can reduce the waste of resources and optimize processes by applying energy-efficient technologies. We illuminate the topics of digitalization and sustainability from a wide range of perspectives and also offer insights into our own ESG strategy. ■

Karsten Trautvetter,
Head of Experience Center Gotha and initiator of the Backstage Lab

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