

Fascinating worlds of sound

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Our team mechanical construction
The machine designers

New approaches are more challenging
Joinery Raphael Haas

Bottles under control
IKUFORM GmbH



Foreword by Mike Beier.

A successful start

Every year we realise many exciting projects, but in spite of numerous publications in trade journals we unfortunately never reach all interested readers. Hence, we have decided to publish a customer magazine that reflects the many facets of our activities.

The first issue of *Insight* appeared in May 2017, and I would like to take this opportunity to thank you for your positive feedback. The latter made me glad and also proved me right. It is my pronounced objective to captivate your attention with informative user reports and to show you the enormous diversity of our customers and, of course, also the broad range of our machines. Moreover, you can catch a glimpse behind the scenes of our group of companies – all this in the style of an investigative magazine.

Personally, I am really fascinated by the topic the cover story of our second issue deals with, as I am often on the road in the cause of good music and always on the lookout for great instruments. My visit to Bechstein last year was an exceptional experience. Reichenbacher can quasi be seen as a pioneer in instrument making, as we have been a supplier of this industry for several decades: from piano and violin making to the construction of electric and acoustic guitars. The combination of the traditional craft with modern computer-controlled machines stands for extraordinary musical instruments.

As you can see: characteristic for the work on this magazine is its great variety, while cooperating with the many smaller teams is great fun. In this issue you will get information on the design department, which often supports me with CAD-graphics or technical details. Their commitment shows that many creative minds are working for our company, who see the bigger picture and also get involved in marketing with great enthusiasm. This is the secret of our success.

We, too, have a contribution to make on Industry 4.0 – see also our conclusive remarks on LIGNA. Here, I would like to point out something not to be overlooked in spite of all the prevailing euphoria. The cyberattacks on companies and institutions worldwide over the last few months show the vulnerability of open systems. An aspect every company has to address. We are absolutely aware of the fact that one has to weigh the advantages and disadvantages very carefully, and we will make every effort to implement effective solutions for your safety in close cooperation with you.

Mike Beier
Marketing Management
Reichenbacher Hamuel GmbH



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New approaches are more challenging

Specialist for complex tasks.

© Schreiner Raphael Haas



While, in the beginning, the fifth axis of the ARTIS was rather neglected, by now it has become indispensable for the production process.

Picture left:
Reception desk for a dentist's surgery manufactured at Haas.

Picture bottom:
An intricate component made from the solid surface material 'Staron' is inspected prior to further processing.

They really exist, these men with sufficient entrepreneurship to venture boldly into unknown territory. Where others play it safe, master joiner Raphael Haas says: „New approaches have always been more challenging for me.“ You probably need this particular gene to dare ‘more’. As visions are one side – courage and creative power are the other one.

Only the application of CNC-technology has put him – 30 years after founding his company – in a position to say: „We create our own markets, we don't just copy things. And since we are using 5-axes technology, we have become more innovative than ever before“.

They draw interest throughout Europe by realising unusual ideas, such as the reception desk at a dentist's surgery. Only a few years ago it would not have been possible to build such a desk 9.5 metres in length from 42 individual parts and to make it look a uniform entity without any visible seams in the end.

Intricate three-dimensional parts

The 5-axes CNC-machining centre ARTIS is perfect for processing exactly these components: intricate, three-dimensional parts from a wide variety of materials, such as the solid surface material Staron for the reception desk. Staron is a homogenous, non-porous material offering great processing flexibility, the thermoplastic properties of which permit the manufacturing of very individually formed parts. The core areas of the joinery company are the manufacture of customised room and front doors, fire-protection doors and elements, for which they have a TSH-license, supplemented by individual pieces of furniture made from wood, aluminium composites and solid surface material. In view of the increasing intricacy of the components, CNC-technology has gained ever greater significance, too.



Conventional technology was no longer sufficient

They had started out using traditional machinery, followed by 3- and 4-axes machines, and since 2010 they have been working with a 5-axes line from the ARTIS series. This upgradable, numerically controlled starter machine possesses all the technical details required by a handicraft business. Reichenbacher calls this 'Flexible CNC-technology for handicraft operations' – a statement affirmed 100 % by Haas. Now, which are the challenges the usual handicraft business is confronted with? Typically, the order situation is dominated by flexibility, as smaller numbers of parts and serial production are in constant alternation. In this situation the ARTIS provides for good repeatability, short set-up times, ease of operation, manifold processing options with respect to material or geometry, plus excellent milling results and a constantly high output even under high mechanical load.

5-axes technology for beginners

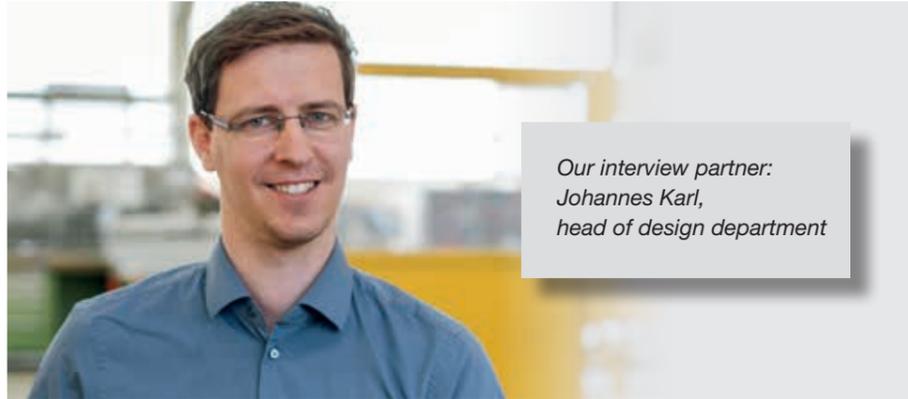
The Haas-line is equipped with a grooved vacuum table of 4,000 x 1,300 mm in size, which is divided into 2 clamping areas for alternate loading. The full-value working unit with its cardanic 5-axes-working head features an automatic tool changer and a milling spindle for milling, drilling, sawing and grinding work. The tool changer provides space for 15 tools. Moreover, a torque support is attached to the cardanic working head to permit the use of additional heads. The employees have become real fans of the fifth axis. This was primarily due to architect Kathrin Haas. Her enormous CAD-skills and numerous connections with designers landed them orders for furniture they would never have anticipated. Her experience permitted the visual development of dynamic components in no time at all and, thus, also the perfect programming for 5-axes milling.

Undreamt-of possibilities

A membrane vacuum press with hot forming station for processing solid surface materials in combination with 5-axes machining has opened up unprecedented opportunities. The breakthrough was an order from a dentist who wanted to have a particular type of reception desk: homogenous and three-dimensional at the same time. Once the drafts had been studied conclusively and some investments made, the desk was built. Although the company had gathered experience with solid surface materials, the component's intricacy presented an enormous challenge, as – with all sides in plain view – no mistakes were allowed to happen in the production process. And the ARTIS kept working – in two shifts, 16 hours a day, for 1 whole year – without any interruption at all.

The machine designers

Here, customer dreams become reality.



Interviewer: Reichenbacher is a machine manufacturer. Does this mean that you and your team in the mechanical design department are somehow the 'fathers' of these machines?

Karl: This is not entirely correct, as also four women are part of the mechanical design team. However, it can be rightly claimed that we influence the design and functionality of a machine a great deal.

Interviewer: How can we imagine the proceedings when you develop a new machine design or intend to 'up-date' the visual appearance of an existing machine series?

Karl: There are different approaches. Often, we have been given more or less precise customer specifications, which we implement to the best of our abilities. If minor modifications are concerned, they will be carried out by an individual. In the case of more comprehensive tasks, we quasi 'divide' the machine up into sub-assemblies, so that several designers can work in parallel. Nonetheless, no one is ever alone, as complex solutions are always discussed and created in a team setting. In the end, all sub-assemblies are brought together again in the configuration of the overall machine.

Interviewer: The development of a completely new machine is certainly less frequent. What is your 'every-day work' like then?

Karl: Especially over the last few years we have indeed developed several new machines completely from the scratch. In addition, we naturally have to keep all our existing machine series up to the latest state-of-the-art. It is, however, correct that the largest part of our every-day work consists of dealing with current orders. In doing so, we select the necessary components from our existing modular system in order to adapt the machine to the individual requirements of the respective customer. By the way, this often leads to new approaches and solutions, too, as Reichenbacher doesn't simply offer machines 'off the shelf'.

Interviewer: Certainly there is input and thus also influence from other sectors? What kind of input do you get, for example, from the sales department?

Karl: The sales department often forwards enquiries as to special solutions, specific customer requests or new application technology. This can be simple matters, as, for instance, the colour of the machine, but also complicated work processes with several parallel processing channels. The impulses from our service technicians, too, are of great importance, because they provide us with practical input from the working environment of our customers. Design is associated with continuous learning and any knowledge gained in this process is immediately incorporated into future projects.

Interviewer: You are working hand in hand with the electrical design department. How do we have to imagine the cooperation to get the machines 'up and running'?

Karl: This is facilitated by the fact that the offices of the two departments are located next to each other. Synchronisation always takes place while the order processing is in progress and primarily applies to driving power, pneumatic plans and cable laying. At a later stage, this will be supplemented by a fine tuning in cooperation with the departments responsible for programmable logic controllers and application technology to ensure that the machines perform the required functions correctly.

Interviewer: Given this wide range of machine series, is there a division of responsibilities?

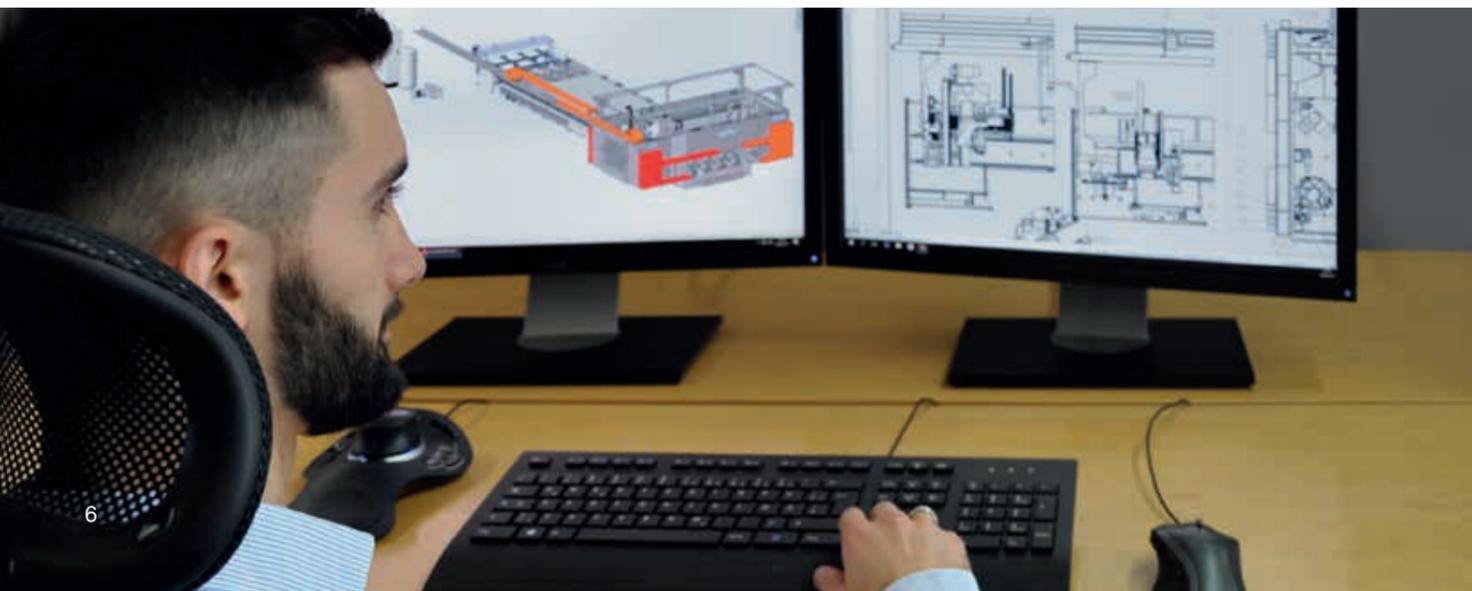
Karl: Yes, such a division exists. The design of certain types of machinery is always handled by the same colleagues, as their respective edge in expertise will considerably accelerate the execution of a project.

Interviewer: For how long have you been at Reichenbacher now and what do you particularly like about your position as head of the design department?

Karl: I have been at Reichenbacher for almost exactly eight years now, the last two years of which as head of the design department. Above all, I appreciate the 'familiar' atmosphere, as here almost everyone knows everyone else and you are not only one among many others. And you get support from your colleagues without much ado. I have always had pleasure in leading people and making decisions, even if this is not always easy. Unfortunately, the additional administrative and organisational tasks leave me with less time for design and development work. In return, I get insights into many other sectors of our company and this, too, is very interesting.

Interviewer: What kind of changes to the machines do you expect to occur in mechanical engineering over the next 10 years?

Karl: Where the mechanical components are concerned, there are recurring topics, such as linear drives and parallel kinematics, in order to achieve ever-better dynamics and accuracies. It is very interesting for all the manufacturers of milling machines to observe the trend towards 3D-printing, as this is an inverse manufacturing process. However, the use of CNC-machining centres provides for a clear cost advantage, and the precision required by our customers, too, can exclusively be reached by a milling process.



Conclusive remarks on LIGNA 2017

Capturing the spirit of 'Industry 4.0'



Rarely any fair worldwide shows an innovation density comparable to that of LIGNA. Once again, it was obvious that the focus has also shifted to materials, such as plastics, composites and aluminium. Thus, this fair becomes ever more interesting for us, as our range of products is exactly suited for these materials. Therefore, we are not astonished that, apart from the typical clientele from the wood-processing industries, we recorded also various contacts from the aircraft and automobile industries, as well as from the composites and plastics industries. Enquiries for specific projects and requests for offers permit an extremely positive résumé.

The prevailing topic was 'Industry 4.0' with all its aspects. Completely in line with the trend, we presented

at the fair a machine from our current project for a customer. For years, the consideration of the entire value creation process has become ever more important, and all renowned machine manufacturers have to come up with ideas to achieve improvements as to quality, process technology and delivery times.

Production 4.0 requires an intelligent supply chain strategy, as the production of the future needs a complex network. Individual sectors will communicate across all hierarchies and the 'Internet of Things' (IoT) will be decisive in implementing this communication. With a modern manufacturing process in mind, we are going to delve even deeper into the field of automatic operating data recording, so that – e.g. based on a cloud – it will

be possible to view and evaluate data worldwide in the near future.

In the forthcoming issues of 'Insight' we are going to present the latest details regarding the expansion of our intelligent networking systems. Let yourself be surprised.



Preview Composites Europe

Capturing the spirit of 'Clamping with ice'



Also in 2017, the Composites Europe – the 12th European Trade Fair & Forum for Composites, Technology and Applications – will be a podium for innovative technologies and a meeting place for specialists from all over the world. This year we will present 'Clamping with ice' for the second time, and not because we are running out of ideas, but because there is an ever stronger interest in this technology.

Traditional clamping technology reaches its limits when the parts are too small, too thin or permeable to air. Clamping with ice, on the other hand, is a technology where also parts from difficult materials or with intricate geometries can be clamped. Traditional technologies fail, for example, in the manufacturing and machining of plates from sintered materials, as these plates cannot be

vacuum-clamped without distortion. The same applies to air-permeable materials, such as honeycomb structures from paper and plastics or porous sponge structures from aluminium, as they are used by the suppliers of the aircraft industry, in rail vehicle construction or for truck superstructures. The sheer size of the parts, too, quickly leads to the limits of feasibility. Extremely small parts machined to utmost precision are required for medical applications, such as the manufacture of medical implants, or for micro systems technology.

The use of this system in a CNC-machining centre is uncomplicated: Clamping is effected by using water to freeze the workpieces to a Kryotool base in a safe and absolutely tension-free way. The base, in turn, is held on the machine by traditional fixing

elements in the same way as a workpiece. Thus, the clamping force is uniform over the entire contact surface.

Parts with free-form surfaces or little mechanical stability, for example, are frozen into an indentation in the clamping base and can then be fixed in any machining plane required. 5-sided milling, grinding or polishing will be possible in one passage without the need for time-consuming additional clamping operations. The efficient automatic thawing system ensures a quick release of the workpiece after machining.

Many companies from very different industries are using this technology in our CNC-machining centres. We will be pleased to present our successful solutions to you in detail.

Bottles under control

The plastics professionals.



Krones, one of the most important machinery and plant manufacturing companies for the filling and packaging industry, have been using components from Ikuform for many years.

In everyday life we use products without usually being really aware how they are manufactured. At first sight, Ikuform supplies unspectacular parts, but without these parts an efficient production flow would often be impossible.

Let's take bottling plants as an example: the modern high-speed lines need intelligent system components for each manufacturing step. Lateral belt guides, transport bars or dynamically controlled rerouting carriages are, for instance, installed to take care of trouble-free routing by connecting, buffering and distributing. This ensures the smooth and safe transport of the containers. Such high-value technical plastic components are also used in the pharmaceutical and the food industry, as well as in the packaging, paper and textile industry.

Modern plastics engineering

Ikuform GmbH offers customised solutions for almost any field of modern plastics engineering. Amongst them are components, such as corner tracks, guiding profiles, pump housings, running wheels, transport bars, sliding bearings, mould carriers, perforated plates, chain guides, gear wheels, collision protection profiles, sliding plates for trucks, deflection rollers and conveyor belts for the automotive industry or plastic slides. In addition to these components, the customers appreciate also the manufacture of special parts to their particular requests. Our specialists will find a solution if you need, for example, extraordinary contours in your profiles or special material specifications, as we are capable of reacting in a quick and flexible manner in our in-house tool manufacturing department or by developing and mixing special materials.



5-axes-machining of a finished plastic part.



„We have proven that we supply first-class products in the field of machining, too, and that we are reliable“, says Dirk Christes, head of production/machining at Ikuform.

Solid mechanical engineering was in demand

Those responsible at Ikuform consider the company's technical equipment an integral part of their success, as they have to respect closest tolerances in manufacturing finished plastic parts. Their decision in favour of a machine with a solid portal structure was mainly due to the fact that they regarded vibrations transferred to the spindle during milling as the most difficult aspect. „We were aware of the costs that could ensue from the manufacturing process owing to structural stability deficits, because the exact surface qualities at smallest tolerances, as they are e.g. needed for components intended for the pharmaceutical industry, cannot be obtained with cantilever machines“, says managing director Markus Wesener.

Thus, they decided on the CNC-line VISION-I Sprint in 2010. This numerically controlled 5-axes machining centre is renowned for rendering excellent results for plastic parts. It is equipped with a sprint unit with automatic tool changer and a milling spindle for milling, sawing, drilling and grinding work. Its reach is 3,740 mm in the X-, 1,600 mm in the Y- and 480 mm in the Z-axis, and therefore all parts can completely be machined to utmost precision in one clamping operation, only. The grooved vacuum table with a plate from solid wood 30 mm thick is 3,800 x 1,500 mm in size and its two clamping areas permit alternate loading. Moreover, there exists a torque support to allow for the use of additional working heads from the tool magazine. The plate tool changer with 24 places and the blasting nozzle, which prevents the fusing together of material and part and thus the formation of scratches on the sensitive surfaces, round off the overall package.

The market requires flexibility

„Our competitive advantages are our reliability, enormous experience and the excellent machining quality of our parts“, says Dirk Christes, head of production/machining, with obvious pride. An alternation between batch size 1 and serial production reflects the usual everyday working situation. However, the latter doesn't imply that all parts of a series are completed at once and then delivered together. This results in the constant necessity for a changeover at the CNC-line. The logical consequence was the acquisition of a second line, as this was the only way to reduce changeover time and optimise planning. „Two lines permit a more flexible response and a more efficient working process“, he adds.

Fascinating worlds of sound

C. Bechstein is an avant-gardist of the industry.

C. Bechstein is a brand of shining brilliance even after more than 160 years. With its top-quality acoustic uprights and grand pianos, the company has succeeded in creating unsurpassed worlds of sound astounding for music fans all over the world. Founded in Berlin in 1853, the company today meets the requirements of artists, institutions and private music lovers alike with its numerous lines of products for almost any budget.

Being an important machine supplier for the number one in piano manufacturing adds to Reichenbacher's reputation. A relationship that was established as early as in the last century, when the Deutsche Piano Union Leipzig placed its first order with them in 1982. Additional orders followed, as this first line was working without any problems and they were more than content. They appreciated the competent partners, and software programmes could always be transferred one-to-one. Currently, there are eight machines in operation in various locations – the oldest one in its 18th year of service.

Saxon manufactory as the guarantor of success

On average, the Bechstein-group of companies reaches annual sales figures of about 4,000 uprights and grand pianos worldwide. The guarantor of this success story has been and still is the company's location in Germany with the manufactory at Saxon Seiffhennersdorf and its 145 highly qualified employees. Here, in a unique combination of traditional craftsmanship and the latest technology, all instruments of the premium brands C. Bechstein and Bechstein are manufactured. The products of the two other brands, Hoffmann and Zimmermann, are made in the Czech Republic and in Asia. Based on this multi-brand strategy, they are in a position to offer something for every budget. However, they all have one thing in common: the development department is exclusive to the German centre of expertise. Here, design and engineering have their origin. Each product, each production step is designed and developed to be realised, supported, verified and documented at the group's various locations.

The grand pianos and uprights are real masterpieces. Carried out with most precious materials, they are unique where sound and touch are concerned. They carry the splendour of the great piano music era into modern times, as the manufacturing methods are state of the art. Thus, technical dynamics is transferred into a traditional manufactory and this results in the intelligent combination of individual craftsmanship with utmost precision and efficiency in basic production.



*Picture left:
Acoustic assembly of an upright
piano completely formatted on a
Reichenbacher ECO-1625-B Sprint.*

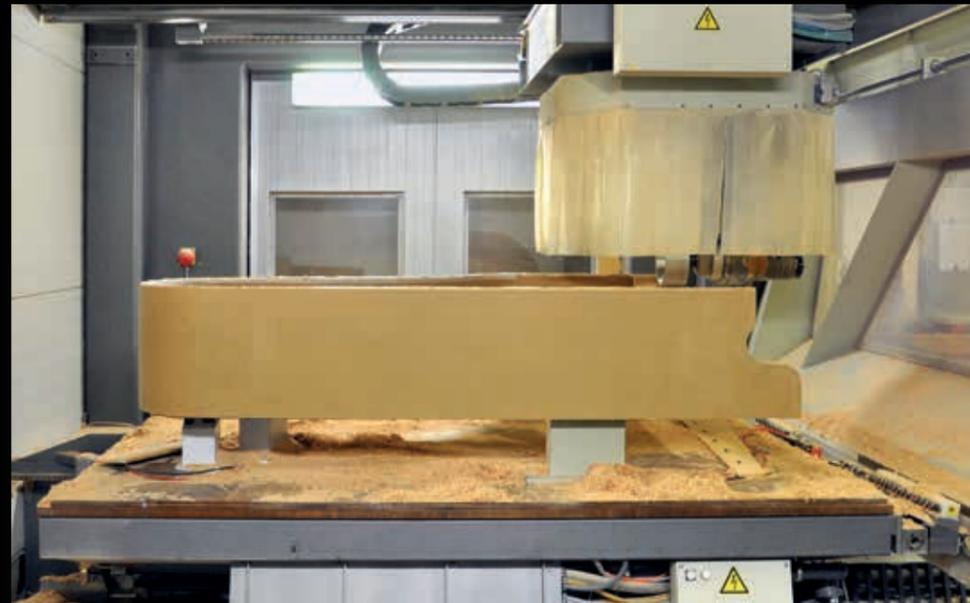


Correlations of sound formation

This is exactly what fascinates engineers, tone specialists, concert technicians and master craftsmen. They perform persistent research work on the correlations of sound formation and the effect of materials, tensions and manufacturing processes. Bechstein has become the avant-gardist of the industry by using modern machine technology. All lines supplied by Reichenbacher over the last few decades have been customised for their respective tasks. Once a sensor to transmit the values measured to the control system via an infra-red interface, and thus to establish the workpiece position, was an essential criterion, and at another time it was a tool recognition system. This applies to the pin insertion machine in the same way as to a metal processing machine and to the other CNC-machining centres. Today, almost 100 per cent of the wooden parts for the acoustic assembly are machined using CNC-lines. However, this is not intended to hide the fact that the time required for pure handicraft work, such as the installation of the action assembly and the tuning operation, still prevails in the creation of the overall piece of art.



Finished long bridge of an upright piano (formatted, holes drilled, recesses milled and pins inserted) on a Reichenbacher UNIVERS.



Formatting of the case of a grand piano on a Reichenbacher PHOENIX.



Cast-iron frame for a grand piano on a Reichenbacher VISION.

There is more than one type of wood

There is a variety of types of wood to be processed, as, depending on the respective application, certain types of wood are simply better suited than others. The soundboard of the instruments is made from spruce, namely from slow-growth trees from Italy that, moreover, have undergone a long drying period. „Only wood that has grown and seasoned unhurriedly will ensure the unique sound quality“, explains Henry Noack, responsible for R&D and CNC. Other components, however, are from pine, as this type of wood is harder than spruce. And yet other components are from beech combined with mahogany layers and other tropical wood types. The special task is to keep the degree of humidity of the wood constant during storage. Therefore, everywhere at the Seiffhennersdorf location humidifiers are in operation.

The designers of Reichenbacher had to deal with the following challenges: The component surfaces are coated with piano lacquer, a particular type of polyester lacquer, which is very delicate and doesn't forgive any handling mistakes. The rounded case contours, too, make great demands on manufacturing technology. Henry Noack explains that the application of CNC-technology in production is imperative, even for reasons of the variety of models alone. In former times, for each step special small handicraft machines had been used, which was still cost-efficient for large numbers of pieces. However, you will no longer get around industrial production where small series are concerned and, above all, in view of the flexibility necessary to cope with special customer requests.

Repeat accuracy in basic production

„Now everything works as a modular system“, Noack says and points out „that the repeat accuracy is second to none. For us, instruments of a low quality level are a no-go.“ „Formatting, fitting, rounding, milling, drilling, grading – all these steps are nowadays performed by a CNC“, he adds. And the tone specialists are enthusiastic when fine tuning the instruments, as all steps have already been perfectly realised in basic production. Reichenbacher can proudly look at a long list of machines supplied to the Bechstein group. At the moment, there are eight machining centres in use at the various locations. Among them is a VISION dating back to the year 1998, which is used for metal processing at Bechstein and, among other tasks, provides the cast-iron frame of the acoustic assembly with threads and holes.



Almost no machine series is missing

The UNIVERS, which was put into operation in 2000, also has its very own task. It processes the bridges: it drills, formats, machines surfaces and, using an ancillary device, drives in pins, to which the piano strings are hitched later on. This is done manually, as during this step the crucial aspect is the optimum pressure to be exerted on the sound bridge by the respective course. This pressure on the soundboard ensures the optimum energy transmission from the touch of the played key. An ECO machines the base plate, a PHOENIX the case of the grand piano, each line having its particular task in the manufacturing process. Special requests have always been painstakingly fulfilled, also in the case of the CNC-line supplied in 2013, where an additional 6th axis for the manufacture and machining of turned parts is installed on the machine bed. Apart from the enormous repeat accuracy, the focus has always been on one target: as of the first piece of a series they wanted to reduce scrap rate and rework to almost zero, and to date they have perfectly succeeded in doing so by using the CNC-lines.

Like no other enterprise, Bechstein embodies the art of piano building. In Lusatia, the best piano builders have come together and there is also no lack of apprentices. During their apprenticeship they get free piano lessons – this, too, is an essential part of the Bechstein tradition, both innovative and lived with great responsibility.

Clean air is their mission

At home in all climate zones.

In 2009, all started with a simple question: how can high-precision holes be made into double-wall V2A- or sheet steel panels in an economically sensible way? It is common knowledge that the machining of stainless steel, in particular, presents a great challenge.

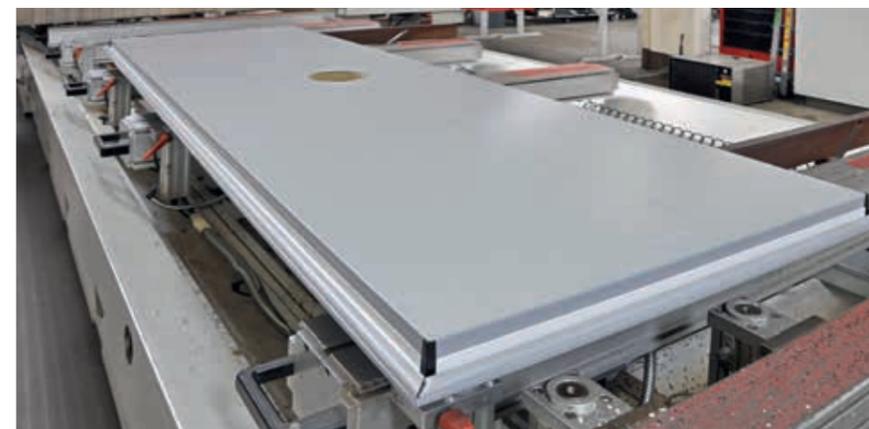
At that time, the required holes were made by means of drilling bits of up to 200 mm in diameter clamped in drill presses. Powerful forces were at work – with all their implications. Specialists from AL-KO Therm in Bavarian Jettingen-Scheppach had set out to find an answer to this question. There, ventilation and air conditioning units of all sizes and versions are developed, tested for most different applications in their own test centre, and manufactured – for industrial, as well as for private customers.

At home in all climate zones

The customers of AL-KO Therm are to be found in all climate zones: from the Antarctic to the tropics. The above statement becomes obvious when you learn that their ventilation and air-conditioning units are used in leisure pools, on the school ship Gorch Fock, in a mausoleum, on oil platforms, in refineries, in chemical plants, but also in cleanroom laboratories worldwide. Even a research station in Antarctica is among their clientele, and by now at the latest it stands to reason that there might be local conditions where you can't simply open a window to air a room thoroughly. And therefore it is not astonishing that almost all important automobile manufacturers worldwide place their trust in this technology, which removes dust and swarf from individual work stations and entire machine parks and provides for clean air – in a very quiet and energy-efficient way.

Clean air

At a total of 50 locations worldwide and a staff of about 4,200 employees the AL-KO KOBER SE is among the leading providers in the fields of vehicle technology, lawn technology and air technology. AL-KO Therm, the company specialised in air technology, exclusively relies on in-house production. In doing so, their special focus is on energy efficiency or heat recovery. A cube always consists of the side panels, the roof, the bottom and the doors, which all have certain grid dimensions and are customised later. The surface coating, as well as the colour, is freely selectable. The individual panels of a ventilation and extraction unit are prefabricated at Wittenberg. Then, individualisation and assembly take place at Jettingen. In 2009, they decided to replace the drill presses by a CNC-machining centre in order to obtain high-precision drilling and milling results.



Picture left: Individualisation and assembly of the ventilation and extraction units take place at Jettingen-Scheppach in Bavaria.

Picture bottom left: Individual panels are precisely machined to customer specifications.

Picture bottom right: Owing to the low height of the machine table, operator Frank Zettler can position the components without any problems.



Guaranteed flexibility

As some of the panels are very heavy and they wanted to have reserves for future parts, they have chosen a solid 4-column portal machine of VISION-II type. The length of the machine of more than 6,000 mm resulted from the dimensions of the largest base frame to be processed. The components are placed manually, a task the operator can handle without any problems owing to the small machine height. If bigger or heavier components need to be processed, a second operator will assist in loading the parts into the machine. However, also smaller components can be processed economically, as 2-station-operation has been provided for. The other technical equipment resulted from component geometry and the materials used. The milling of steel sheets is relatively uncomplicated. If, however, stainless steel components are used, it gets more difficult. On the one hand this material needs to be clamped differently, and on the other hand the machining processes must precisely be adapted with respect to the feeds and tools.

The 5-axes-line is equipped with gantry drive and beam table. The console table is in standard design, however individually adapted featuring 10 workpiece consoles, four pneumatically retractable stops with automatic control, one fixed-stop beam with two pneumatic stops, and one support beam with pneumatic lifting as workpiece support, which is fixed to the table beams. The automatic plate tool changer has room for 24 tools and is situated inside the portal enclosure. This is completely sufficient, but if plastic or aluminium parts need to be processed after all, the bevel gear will be available in addition.

Closed energy chains, minimum quantity lubrication and oil mist extraction are regular features of this machine, but the additional laser projector is a high-light. It exactly projects the various geometries onto the sheet steel parts and the operator will immediately see, where the holes and cut-outs are to be placed. This exact positioning is indispensable for batch size 1 manufacturing in order to be capable of excluding errors completely in advance. In the opinion of Martin Weschta, master craftsman and head of tinsmith department, thanks to the CNC-machining centre working has become much easier.

Lead by experience

Customised solutions.



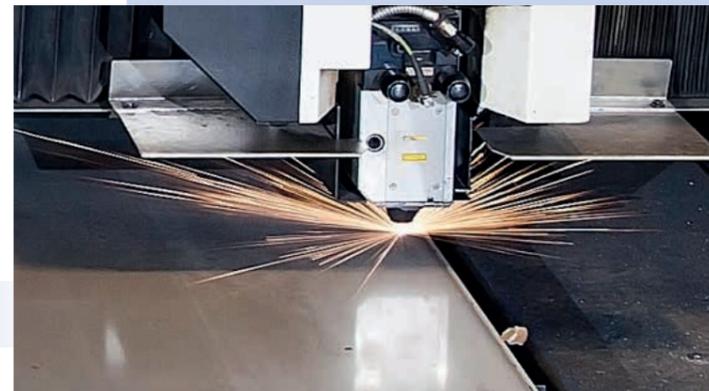
HAMUEL Maschinenbau Plauen GmbH & Co., which is part of the SCHERDELGroup, has been manufacturing demanding sheet-metal, bent and welded parts from structural steel, stainless steel and aluminium for about 20 years. Reputable customers from the sectors of mechanical engineering, machine tool and plant building, as well as manufacturers of textile machinery, press manufacturers and tool makers, have come to rely on the company's individual and customised solutions. They warrant for great flexibility and short delivery times thanks to comprehensive material stock-keeping and the coverage of the entire range of in-house manufacturing – from material cutting to the finished welded part.

Their range of activities:

1. Laser machining

Laser (beam) cutting is a thermal process that offers advantages over other technologies, as it is a non-contact process without tool wear. This force-free machining of the components causes only minimum thermal load and therefore no change in the properties of the material. Moreover, this technology permits high machining speeds, and even intricate shapes and smallest contours and holes as of 0.7 x material thickness can be laser-machined.

A multitude of materials, such as structural steel, stainless steel and aluminium, can be processed using this technology. Laser cutting is ideal for components and component assemblies, where minimum distortion and best cutting quality are essential.



2. Sheet-metal forming

In sheet-metal forming, progressive manufacturing technologies applied by HAMUEL ensure utmost quality and process reliability. Their scope comprises, among other services, the manufacture of sheet-metal components for technical applications and of complex assemblies from thin sheet-metal as sample series, as well as in small- and large-scale production. The components range from sheet-metal covers weighing a mere 0.1 kg to bent parts of 400 kg.

Optimum use of the advantages of laser cutting and bending can be made, when the sheet-metal components possess the appropriate design. Then intricate and cost-efficient components can be manufactured without any costs for tooling, and this as of a batch size of 1 piece.

3. Flame cutting

In spite of the increasing importance of other processes, such as plasma, laser and water jet cutting, from an economic point of view there is no alternative to autogenous flame cutting in the case of greater material thicknesses of up to 600 mm. This is particularly true, when the cutting quality, a possible distortion of the component due to the greater heat input, as well as the hardening tendency of the material, are no crucial factors.

The company's good technical equipment permits flame cutting as per DIN to be carried out at a high cutting quality. Serial parts can be cut using up to four flames simultaneously. CAD-data received from the customer are immediately adopted, which saves time and reduces possible sources of error to a minimum.

4. Welded assemblies

No matter, whether the welding of steel or stainless steel, stud or spot welding, drilling, countersinking or threading work is required: HAMUEL Plauen manufacture customised welded assemblies, among others, for machine tools, woodworking machinery and wire processing machines. Given their 20 welding stations and large storage capacities, they can manufacture components up to a total weight of 25 tons and a size of 17,000 x 4,000 mm quickly and efficiently at short notice.

HAMUEL Plauen possess the highest international certification as per DIN EN ISO 3834-2:2006 for the fusion welding of metallic materials. This globally recognised standard is of major significance, predominantly for legally regulated areas, such as structural steelwork, the manufacture of pressure equipment and railway vehicles, as well as pipeline construction and machine building.

5. Finishing

A follow-up treatment can further improve the material properties of the components. The stress relief heat treatment, for example, considerably reduces stresses in the component caused by thermal or mechanical working processes, whereas sand blasting removes layers of rust or scale. This is the optimum preparation of surfaces for priming, painting or powder coating.

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- Tool changer with 7 places
- Fixed machine table (steel beams, grooved table HPL or aluminium)

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