

175 YEARS  
1840-2015





175 years CES

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# 175 years CES Teaming up for security

Dear employees, shareholders, business partners and friends,

in 2015, C.Ed. Schulte GmbH Zylinderschlossfabrik – or CES in short – celebrates its 175th anniversary. A remarkable date, an extraordinary event and a reason to be joyful for everyone who has contributed to this success story.

The history of the company spans seven generations. Over this time, the members and associates of the owner family have accumulated a wealth of experience, and have time and again advanced the locking industry with visionary decisions and pioneering innovations.

“Teaming up for security – since 1840” – Our new corporate slogan indicates how this development became possible: through the synergies and collaboration of management, employees, partners and customers. The essential contribution to the long-term success has been made by the employees who have given their best for the company with their expertise, their commitment and a great deal of creativity. It is they who have made CES the manufacturer of innovative locking systems and the universally respected and reliable business partner that CES is today.

On the occasion of this anniversary, we want to recall the colourful past of CES – not always in chronological order, but always fascinating and rich in its variety. And we also want to look at what CES is today and what the future may bring.

I wish you pleasant reading!

Yours

Richard Rackl

Managing Director of CES-Gruppe



## A story in four acts

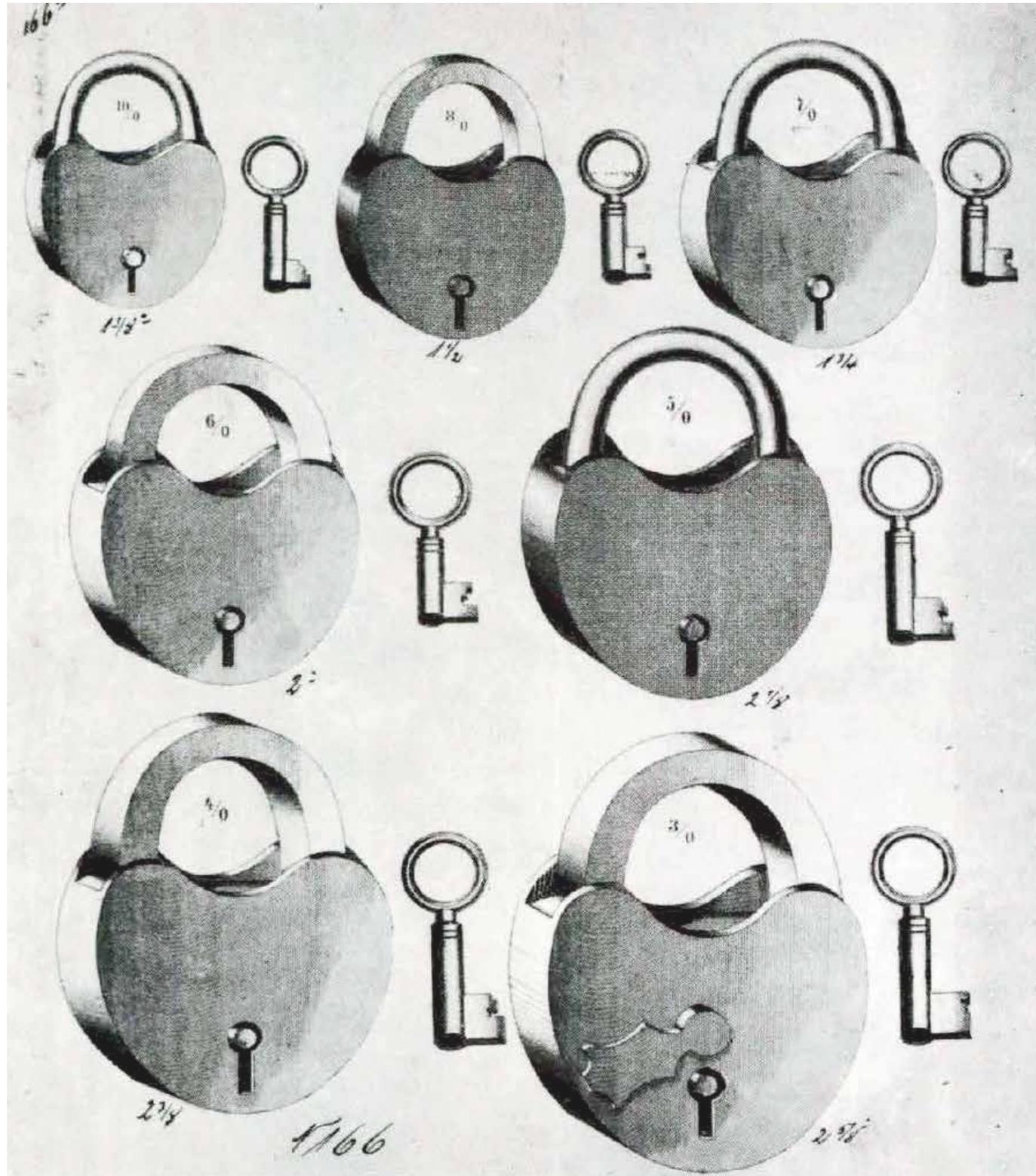
When Heinrich Schulte decides to set up on his own as a locksmith, this is a courageous step. Much earlier than his contemporaries in Velbert, he has realized that the world is undergoing a sea change. Wanting to keep pace with the rapid developments, he is aware that he must adapt old manufacturing methods to put his young enterprise on a sustainable footing.

Also today, 175 years later, the company remains true to the insights and the philosophy of its founder. The current transformation is referred to as "Industry 4.0" – the fourth and most recent of a series of industrial revolutions.

The first revolution was started by the introduction of the steam engine, the second by automation and the introduction of assembly lines and the third came about by the integration of electronics and data processing in the manufacturing processes. With Industry 4.0, we are now approaching the point of full digitization and customization of manufacturing technologies. The Internet-driven transformation of the industry comprises the technological transition from the current production engineering to a smart networking of man and machine.

These four phases of the industrial revolution are also reflected in the development of CES and mark important turning points in the corporate history.

# Heinrich Schulte From cottage industry to master locksmith



The king is dead – long live the king! On 7 June 1840, the Prussian king Frederick William III dies, the king who twenty-seven years earlier led Prussia to its victory over Napoleon in the Battle of Leipzig. In the aftermath, the duchy of Berg – which also includes the municipality of Velbert – becomes part of the Prussian state. After centuries of relative lack of leadership, a period of stability begins in a country that still is composed of a multitude of independent individual states. Now, the late king's eldest son Frederick William IV (1795–1861) ascends the throne and continues the social and economic reforms started by his father.

Only six years earlier, on 1 January 1834, the German Customs Union was created under the leadership of Prussia, an association of states relinquishing the customs borders between them. This has created an internal market of a size hitherto unknown in Germany – a development that also has a long-term positive impact on the lock production in the lower Berg (Niederberg) region.

Locks have already been manufactured by farmers in the Niederberg region since the middle of the sixteenth century. The small farmers hardly have any own land and the soils are poor. Since the farmers cannot live on farming alone, they engage in a cottage industry of manufacturing locks in small workshops attached to their farmsteads and cottages. The products of these small locksmith operations are collected by specialized merchants and transported to the big markets in Frankfurt, Cologne and Leipzig.

Over time, however, the two sectors – craft and agriculture – gradually take separate ways.

Heinrich Schulte is born on 25 September 1806 in the cottage Am End. In 1835, he marries Sophia Margaretha Müller of the nearby town of Ratingen. The report on his army physical describes his outer appearance and notes that he suffers from the consequences of hard labour, which – as is customary in those days – he has been performing in his father's workshop since the age of twelve. Because of his "flat chest and curved thigh", he is judged to be "too small" with his four feet and eleven inches and is deferred from military service.



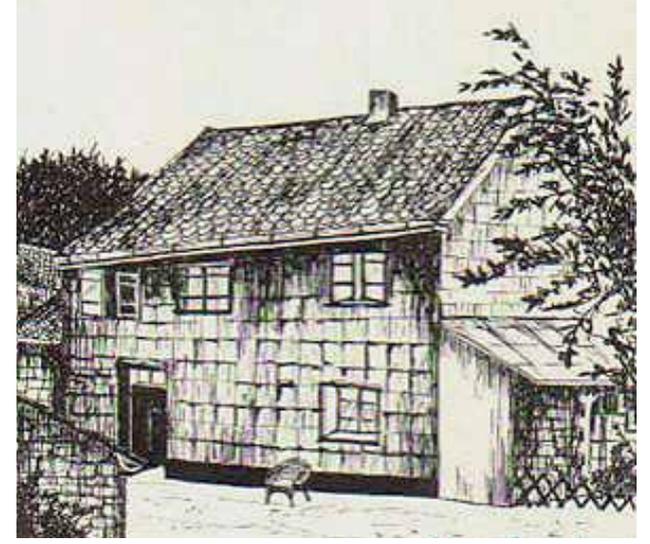
The cottage Am End at the corner of Bahnhofstraße, the birthplace of Heinrich Schulte, demolished in 1938



Birthplace of Carl Eduard Schulte in the cottage Zum Stein in the small rural district of Klein-Umstand

Heinrich Schulte is one of the first in the village to manufacture locks no longer as a side-line but as a master locksmith with journeymen and apprentices in a regular craft business. He also introduces the first simple machines such as manual presses in the manufacturing process. While they make the work a lot easier, they are still fully operated by hand.

Heinrich establishes his workshop in the house Am End at the corner of Bahnhofstraße and Friedrichstraße, continuing a family tradition: his grandfather Gerhard Wilhelm and his father Johannes Frantz have also had a small workshop in their cottage called Am untersten Hackland in the small rural district of Rottberg. On 3 June 1839, Heinrich's son Carl Eduard Schulte is born, whose initials are later used to give the firm its name.



Early drawing of the cottage Am untersten Hackland



Am untersten Hackland, the ancestral seat of the Schulte family

# A book of accounts documents the foundation of the business

Heinrich Schulte's book of accounts of 1840 shows that he is now negotiating directly with his customers. The majority of his business contacts are in the Berg-Mark region but his connections also extend to Berlin, Frankfurt and Stuttgart. The product range comprises a wide assortment of furniture locks with wards or tumblers. They are identified by their purpose, e.g. desk lock, clock case lock, drawer lock, escritoire lock, hunting case lock, Bavarian casket lock or barrel lock – a kind of espagnolette lock.

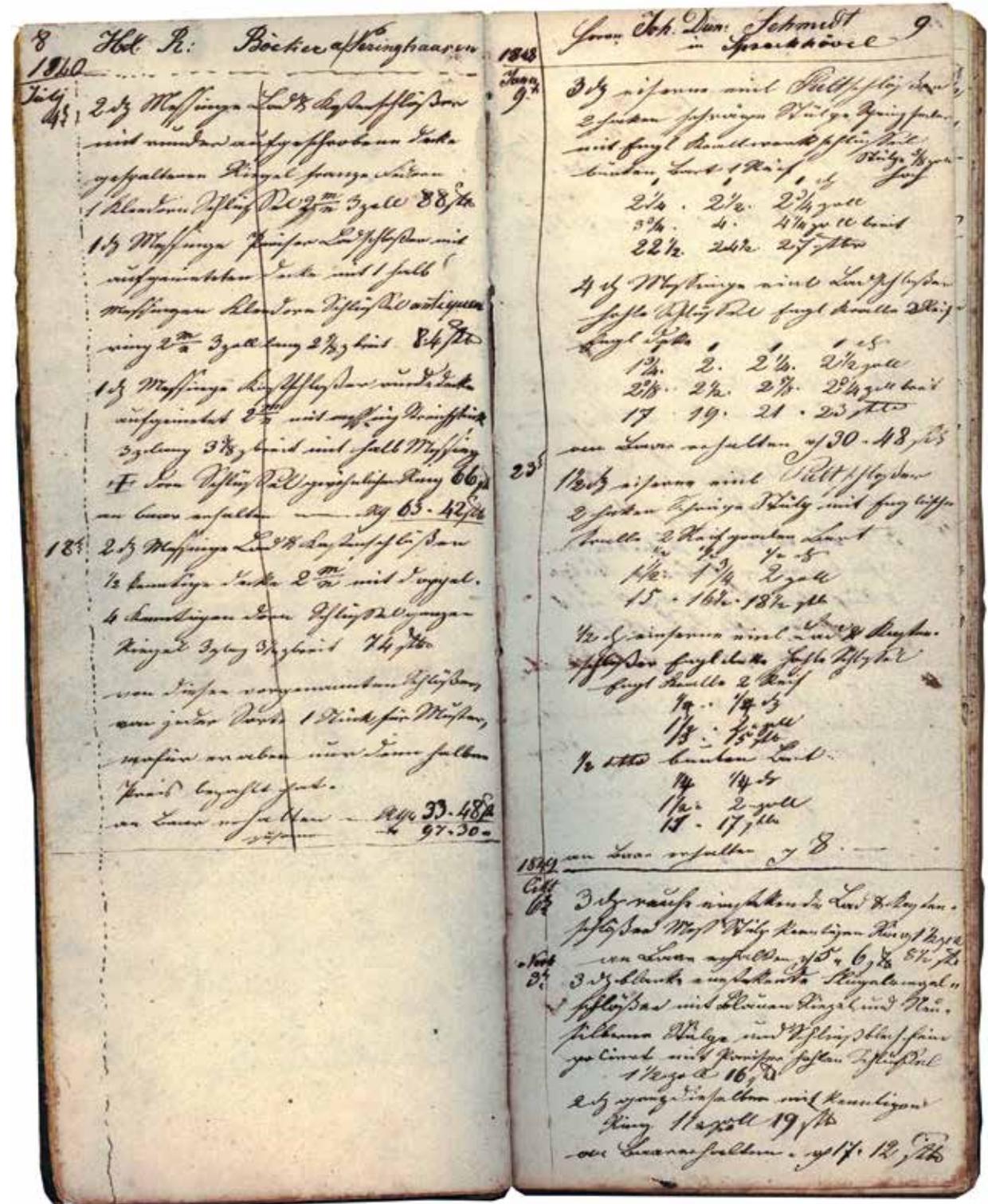
For centuries, cash hardly plays any part in the life of locksmiths. The trade with the merchants is handled in direct barter transactions. In 1849, the Prussian state bans this practice – called truck system – which makes the manufacturers much more independent.

Another milestone is the foundation of the Velbert guild of locksmiths and brass founders which now regulates the training and safeguards the interests of its members. It also assists enterprises in purchasing equipment such as hand-operated fly-presses and lathes.

The year is 1840 and Heinrich Schulte opens up a small manufactory for the production of locks and fittings in Velbert. In doing so, he builds on a craft tradition in the Niederberg region that goes back to the sixteenth century. But the young enterprise is also a pioneer right from its start. In 1896, CES installs the first steam engine and with it enters the industrial age.



Book of accounts of the years 1840 to 1858





Sophia Margaretha Schulte, née Müller



Carl Eduard Schulte



Maria Gertrud Schulte, née Terbach

On 10 December 1857, Heinrich Schulte dies and is the first member of the family to be put to rest in the still existing family grave in the so-called Silent Park. His son Carl Eduard, who has just turned eighteen, takes over the management of the business together with his mother Sophia Margaretha Schulte.

Some time later, the workshop is moved to Hoferheide near today's Heidestraße. In 1860, Carl Eduard Schulte completes his apprenticeship by manufacturing a rim lock as his journeyman's piece.

In 1870, war is again waged against France. The enemy is Napoleon III, the nephew of Napoleon Bonaparte.

The conflict binds the allied German states together under the leadership of Prussia. After the victory, the German Empire is proclaimed in Versailles, and the Prussian king William I – who had taken over the reign from his brother Frederick William IV in 1858 – becomes the first German Emperor.

This creates a new economic powerhouse of an enormous size right in the middle of Europe, and it unleashes an undreamt-of potential. The cities at the Ruhr river explode, and also in the more placid Velbert, these changes are palpable. The foundation of the German Empire triggers a rapid development that has a deep impact on all areas of economy and society.



Certificate of the journeyman's exam passed by Carl Eduard Schulte in 1860

# With coal and steam Industry 1.0

Coal and steam are the two drivers of the first big industrial revolution. For centuries, manufacturing sites have always been established near creeks or rivers to use their water as a source of energy for production. Places like Velbert that are not located near waters have therefore been at a clear disadvantage.

In 1769, James Watt is granted a patent for a steam engine. Now it is possible to produce everywhere, as long as coal can be supplied to the site. Machines take over work in the factories but they still only perform a single step in the production process. Now as before, workers have to bring the individual workpieces from one machine to the next.

It takes some time, however, until the steam engine finally also starts its triumph in Velbert.

In 1809, the towns of Velbert and Heiligenhaus have 4,000 inhabitants. In 1840, the population has already risen to 5,800 and by 1880, the population has grown to 9,000 people, 47% of which earn their living in the lock and fitting industry. Since locks have a particularly favourable ratio of value to weight, they are excellently suited for export. They owe their value not primarily to the starting materials but rather to the labour and expertise required for their manufacture.

The belated entry into the age of the steam engine also has another reason. An essential drawback of the Velbert location is its poor connection to the transport network. Coal must be brought into the

town on horseback over bumpy paths. This makes coal as a fuel so expensive that for a long time, the use of steam engines simply does not pay off.

This situation only changes in 1888, the 'Year of the Three Emperors'. Frederick III, the successor of William I, dies after a short time and his son William II succeeds to the throne at the age of only 29. To honour the late emperor, Velbert renames its Essen-Solinger street to Friedrichstraße. But 1888 is primarily a year of destiny for Velbert because the town is finally connected to the national railway network – fifty years after the neighbouring town of Langenberg. Now raw materials can be brought to Velbert in previously unthinkable quantities – and finished products can be exported all over the world! From 1891 to 1911, the volume of goods leaving Velbert increases from 850 to 13,376 tonnes. The foundations for the industrial rise of Velbert have been laid.

Figure on the right: Present of the employees on the occasion of the marriage of Max Schulte in 1904





The photo from 1883 shows Carl Eduard Schulte with his six children. His first wife Maria Gertrud, née Terbach (not in the photo), dies only 35 years old on 18 April 1883 after a severe illness.

Carl Eduard Schulte has his hand on the shoulder of his son Emil and carries his daughter Ella on the arm. The girl on the chair is his daughter Mathilde who has her brother Alfred, born on 4 January 1883, on her lap. Standing behind her is her brother Egmont, and the one in the child's chair is Max, who together with his younger brother Alfred takes over the management in 1903.



Packing department around 1910

Carl Eduard Schulte is one of the founder personalities who know how to seize the moment. These personalities have given the entire period its name: Gründerzeit – the Founder Epoch. First, in 1874, he operates his small smithy next to the house called Im Testament behind the house Am End. In the same year, he moves into a dwelling house on Friedrichstraße.

On 1 July 1887, he breaks ground for the factory on Friedrichstraße, and already on 1 May 1888, the business moves to the location it still occupies today. At the same time, the firm is entered into the commercial register. In 1890, Carl Eduard Schulte has already 40 workers in his operation.

## The third generation and the first steam engine

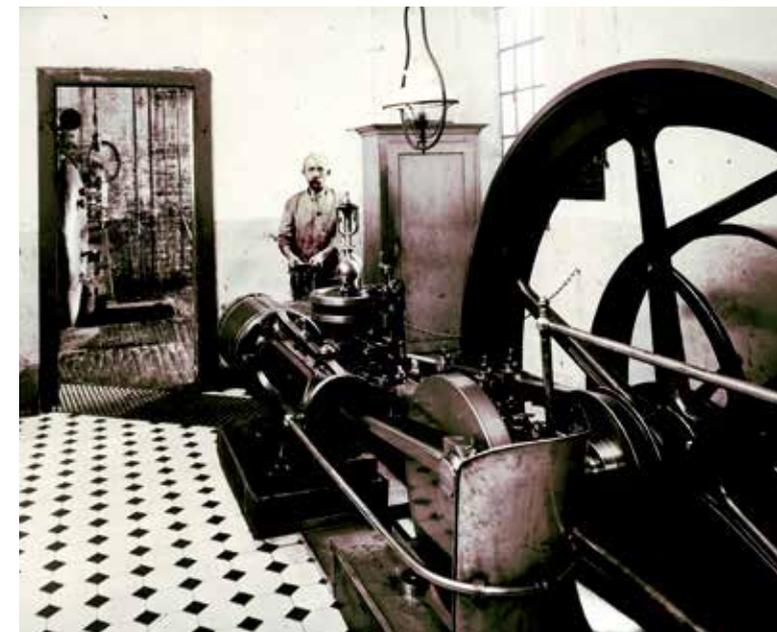


In the office in 1910:  
Alfred Schulte,  
Max Schulte and  
Ernst Laue

In 1896, CES puts the first steam engine into service. In the years to come, business flourishes. Already in 1903, a new and more effective steam boiler is bought. But then a tragic accident happens. During the installation of the boiler, Carl Eduard Schulte is injured. He dies on 30 July 1903 of blood poisoning. His son Egmond already died the year before so that now the two younger brothers Max and Alfred jointly take charge of the firm. In 1905, the ground floor of the dwelling house is converted into an office and later, the factory is extended by press room, key-making shop, die- and punch-making shop and semi-finished goods warehouse, lock assembly shop, washing and

changing rooms and toilets. In 1909, the engineer Ernst Laue, originally from Limburg, enters the business as a co-owner.

The façade of the office and dwelling house is lavishly decorated with stucco and presents a prestigious exterior towards Friedrichstraße. This is also where the accounting office, the Kontor, is situated. A photo from the time shows the managing directors Alfred and Max Schulte and Ernst Laue, partly in black suits with watch chains, and Alfred Schulte and Ernst Laue with twirly moustaches in the Kaiser's style. Alfred Schulte is the one sitting at the large mechanical calculation machine in front.



Steam engine as from 1896

The factory is located behind the office building. The engine house with the high chimney rising up into the sky accommodates the shining symbol of the new era: the steam engine. It is almost silent, moving only with a slight hissing sound. The energy it produces is transmitted to the machines by a system of shafts and wheels attached below the ceiling. Wide leather belts then transfer the rotation of the wheels to the machines. Light is admitted through windows in the shed roof to illuminate the row of machines in the machine shop. The employees work with utmost attention and

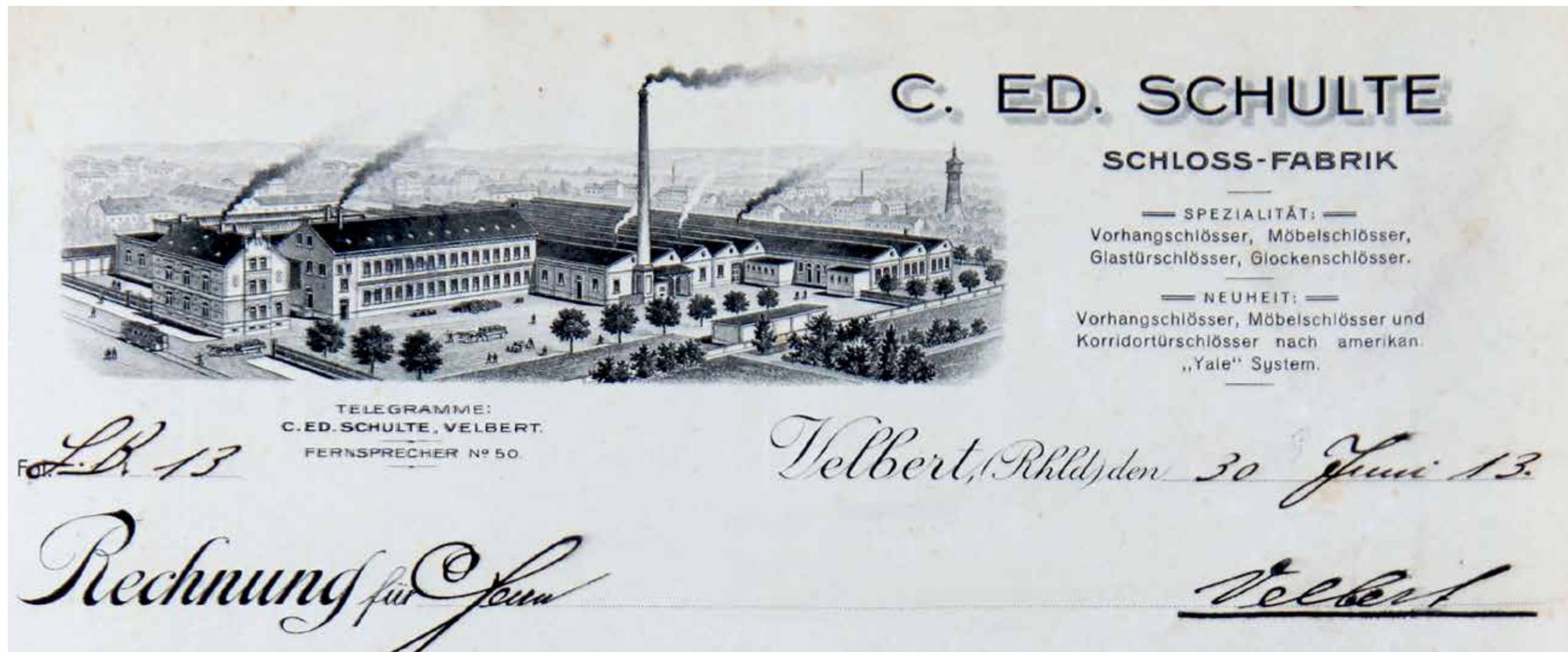
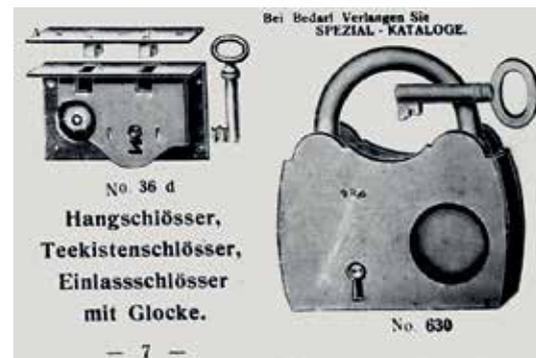


Transmission in the press room, around 1910

circumspection to avoid becoming caught in the machine during the continuous up and down movement of the die-sets.

Compared with today's standards, toolmaking is still relatively inaccurate so most of the pieces must be reworked by hand. This requires exactly the manual skills that have been perfected in this region over the centuries. The workpieces get the desired lustre in the grinding shop. No exhaust systems exist, so at the end of the day, the grinders step out shining in gold or silver, almost looking like aliens.

The product catalogues of the early 1920s illustrate the wide CES range of door, furniture and padlocks. It also includes so-called tea chest locks with a bell that sounds when the lock is opened, or padlocks that can be loaded with a rifle cartridge and are used to protect the goods wagons of the Siberian Railway against looting. For the latter, the Imperial Patent Office in Berlin grants a patent titled "Padlock with a cartridge firing pin that can be triggered by the key and subsequent displacement of the bolt". In case of unauthorized opening attempts, e.g. with a wrong key, the cartridge will ignite – with fatal consequences for the potential thief.



The invoice sheet from 1913 shows the factory and the dwelling house on Friedrichstraße

Pages of product catalogues from the 1920s

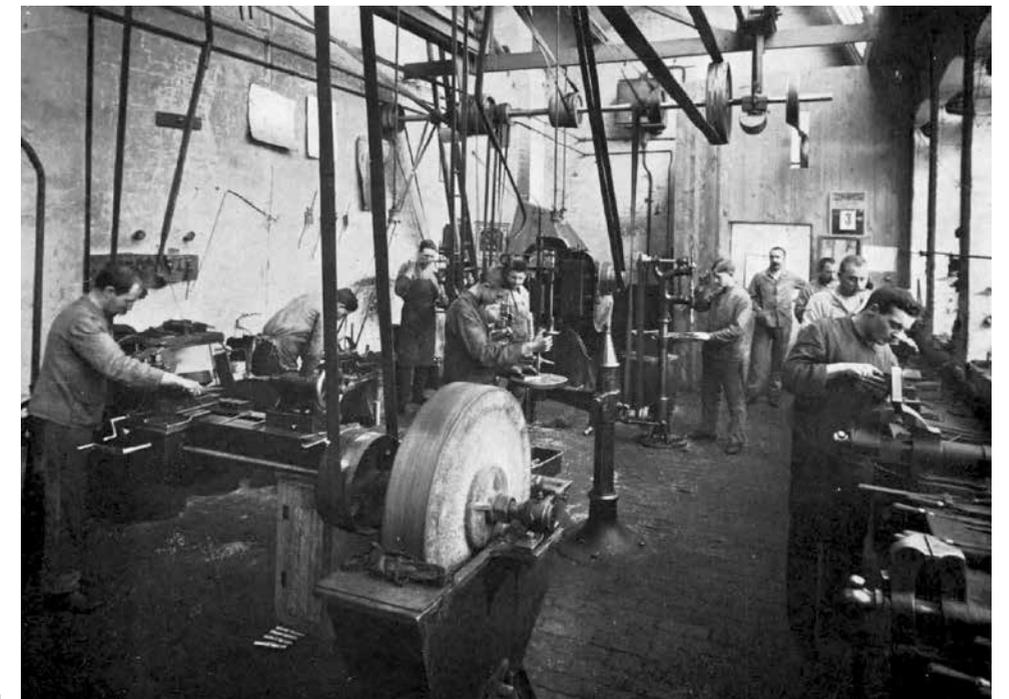
# Assembly, grinding shop and die and punch making around 1910



Assembly shop



Grinding shop



Die and punch making

1909

## The birth of the CES locking cylinder

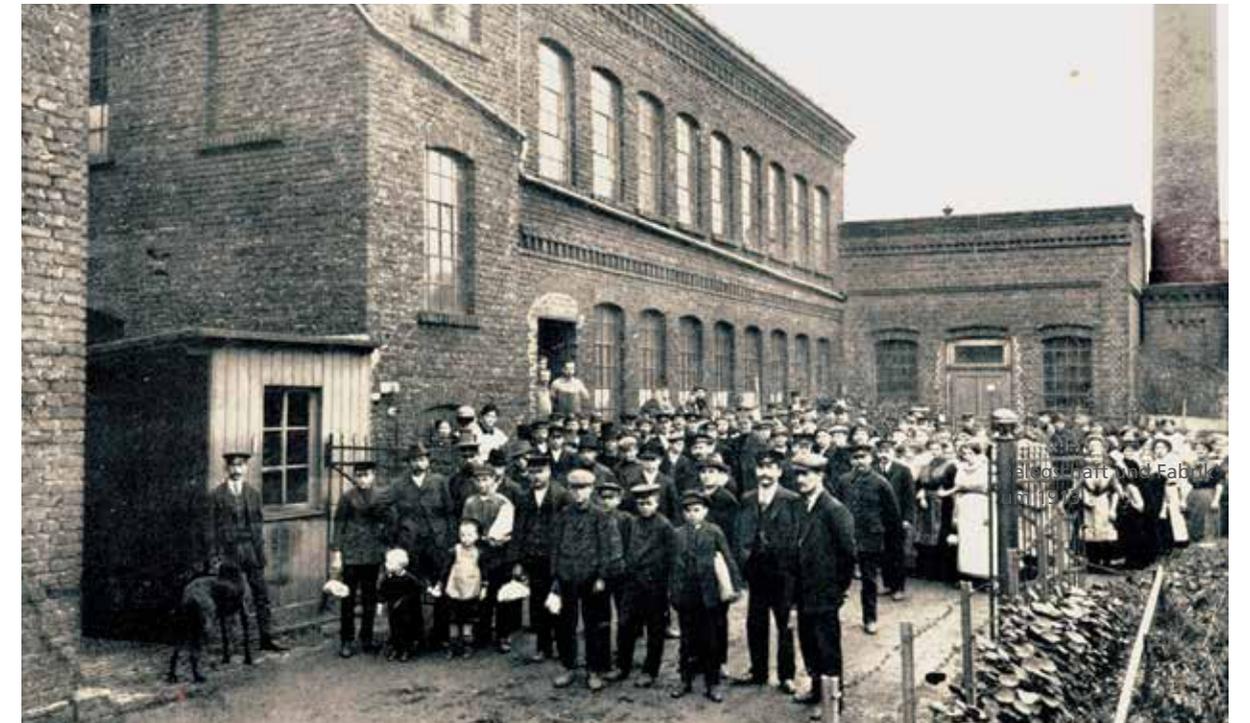
In 1909, a decision is taken that sets the company on its course. As the first manufacturer in Germany, CES starts the production of locking cylinders. The locking cylinder is based on a patent granted to the American inventor Linus Yale Junior in 1865. In the United States, it subsequently develops into a genuine success story. The revolutionary difference to the traditional locking mechanism is the separation of the code from the actual bolting operation. This innovation also allows a higher number of lock and key combinations. Another important advantage is that in case of a lost key, only the cylinder but not the entire lock must be replaced. Since the locking cylinder in its basic function is fundamentally different from the traditional warded locks and tumbler locks, its manufacture is a real challenge for CES.

Especially the creation of the profile keyway in the cylinder plug is a complete novelty in lock making. Initially, the plug is assembled from two parts. Shortly afterwards, self-designed machines are used. From a Saxon company, CES also purchases a machine for paracentric cylinders.

This marks the beginning of the production of plugs with paracentric keyways. Soon, the range comprises all kinds of cylinder locks for doors and furniture. CES becomes the market leader in Germany. The first simple locking systems are manufactured – with an associate gold-plated master key.



Multi-language catalogue page from 1920



In 1914, CES already has 130 employees and exports its products to nearly all countries of the world. Sales agents travel with their samples to new markets where they negotiate with potential customers or intermediaries.



Employees in 1913

Assembly shop around 1910

# Turning point for industry and society

The outbreak of war in 1914 puts an abrupt end to the idyll in the Berg region. Europe and in fact the whole world are torn apart. At first, soldiers march into the war singing patriotic songs for “king and country” (or rather “Kaiser and Vaterland”) but soon the mechanized warfare shows its cruel face. Until November 1918, about 17 million people lose their lives all over the world.

Max Schulte is called up for the medical service, Ernst Laue for service in the navy. Alfred Schulte continues conducting the business until Max returns and Alfred himself is called up. Miraculously, all three of them survive the war without suffering injuries.

By 1916, most of the metalworking operations have converted large parts of their capacity to the production of war material. Locks and fittings can only be exported to very few, neutral countries. Most of the men from the Niederberg region and everywhere else in Germany are at the frontline, and as a consequence of the general lack of labour, more and more women and youths stand at the workbenches.

The 1919 Treaty of Versailles lays down the German reparations for the devastations of the war and results in a severe impairment of the export trade – a grievous blow to the Velbert industry that has long been very export-oriented.

Reparations in an unparalleled amount are imposed upon the young Weimar Republic and it is clear that the country cannot pay these sums. When Germany defaults on its payments in 1923, French and

Belgian troops march into the Ruhr region and also into the Niederberg area.

The French levy high customs duties at the borders of their occupied area and demand penalties by the business operations which is the end for many of the lock and fitting companies. CES alone, a joint stock company since 1921, is sentenced to pay 200,000 francs.



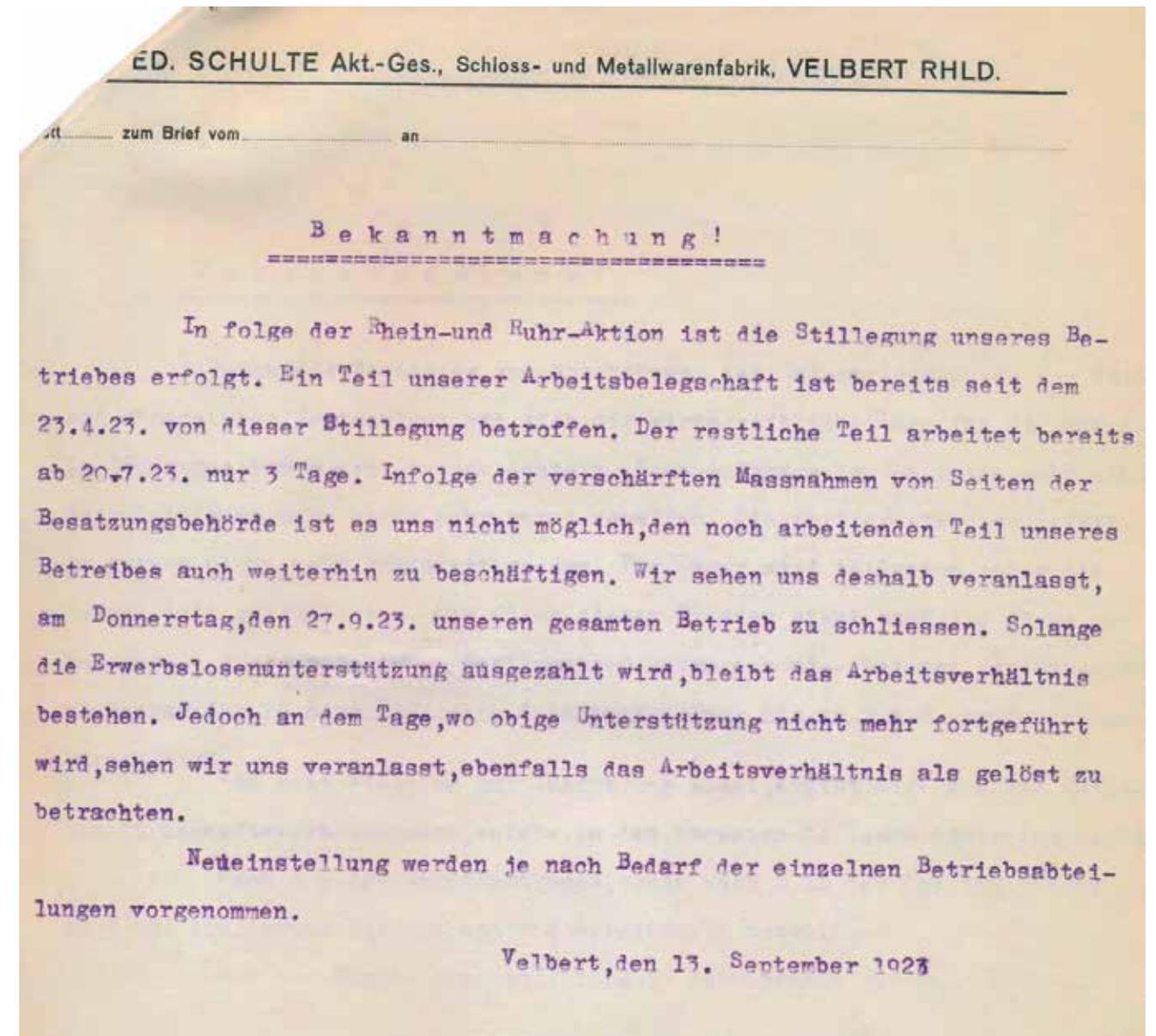
CES share from 1921

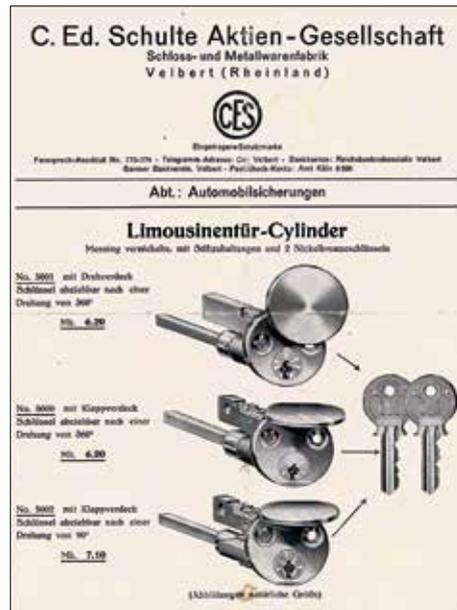
## Announcement!

As a consequence of the Rhine and Ruhr campaign, our operation has been shut down. Some of our workers have already been affected by the closure as from 23 April 1923. The remaining staff has already been working only three days per week since 20 July 1923. As a consequence of the tightened measures taken by the occupation authority, we are unable to continue employing those of our staff who are still working. We are therefore forced to close our entire operation on Thursday, 27 September 1923. As long as unemployment benefit is being paid, the employment will remain effective. However, as from the date when this payment is discontinued, we must also consider the employment to have been terminated.

New employment will be made depending on the requirements of the individual departments.

Velbert, 13 September 1923





Limousine door cylinders and handles and gearbox lock from 1920



Lorry in 1922

In the 1920s, CES produces cylinders for the doors of limousines, handles and gearboxes for a short period.

As a consequence of the mass production in the automotive industry, however, the brass cylinder is soon cut out by the cheaper zinc die cast cylinder.

In 1923, the entire monetary system in Germany collapses in the face of hyperinflation. The value of the Reichsmark plummets and in November 1923, one American dollar is worth 4.2 billion (meaning million million) marks. Surprisingly, the rapid devaluation initially has a positive effect on the economic situation in the Niederrhein region because many foreign customers now use the drop in the value of Reichsmark to buy German goods on the cheap. But then, the 24 October 1929, known now

as "Black Thursday", precipitates the most consequential stock exchange crash ever and the beginning of the Great Depression, a global economic crisis that also proves devastating for the lock and fitting industry. Within an extremely short period, the export share of the Velbert industry plunges by more than 75%. CES plunges into the deepest crisis in its history. The number of employees drops from 280 in the year 1925 to a mere 75 in 1931.



Inflation banknote from 1923



## World War II, a new start and the Wirtschaftswunder

In 1939, Nazi Germany invades Poland – this is the prelude to the Second World War. Again, the lock factories in Velbert are converted into armouries; again, the men are sent to the frontline and the women are called into the factories. Also forced labourers and prisoners of war are deployed to produce weapons and ammunition – in and around Velbert alone, these number about 10,000. The injustice they suffer is acknowledged and – at least partially – compensated only much later. Since the year 2000, the foundation “Remembrance, Responsibility and Future” (EVZ) – a joint project of the German government and the Foundation initiative of the German industry – has been committed to compensating the victims. Also CES has participated in this initiative.

In the spring of 1945, Nazi Germany is defeated. On 17 April, American forces march into Velbert without meeting any resistance worth mentioning. Later, the town is made part of the British occupation zone.

On 21 June 1948, the three western occupation zones introduce the Deutsche Mark, on 23 May 1949, the Federal Republic of Germany is created. At the same time, the German Basic Law becomes effective. In its preamble it says: “The entire German people is called on to achieve by free self-determination the unity and freedom of Germany.”

In the same year, Max Schulte dies and the management of the company is continued by his brother Alfred and Ernst Laue alone. A prolonged period of economic recovery commences which

is soon termed Wirtschaftswunder, the economic miracle or The Miracle on the Rhine. 1955 is the economically most successful year of the German history.

As in many small to medium-sized enterprises in the Berg region, also the owners of CES put great store by the work ethics of the Protestant middle class. In particular the sense of responsibility and the duty of care towards the employees are highly developed.

*Two global wars, currency collapse, stock exchange crashes and finally the rise of fascism – the first decades of the twentieth century were a period of political turmoil and economic distortions. Also economy and industry underwent a profound change. Assembly-line work and automation marked the beginning of the second industrial revolution. During that time, CES became a company of international renown – and a pioneer in company benefits and social responsibility.*

In 1953, Ernst Laue and Alfred Schulte establish a captive provident fund that guarantees a pension to all employees who have been with the company for more than fifteen years. But for CES, the term “family business” not only refers to questions of ownership and the composition of the management team, it also means that many children follow their parents to work in the company – even whole families work side by side.



Extension of the factory up to Oststraße in 1960

In 1958, the buildings erected in 1908 (among others press room, key-making shop, die- and punch-making shop and semi-finished goods warehouse) are combined with the parts built in 1920/23 (lock assembly shop, semi-finished goods warehouse, profiling lathe shop, grinding shop and extended plating department). In 1960, a new building is constructed on Oststraße. With this, the expansion potential at the traditional seat has been exploited for the time being.

After World War II, Germany suffers an acute housing shortage. Millions of expellees flow into the country. Also the economic boom results in a rising demand on the housing market. The enactment of the First Housing Act in 1950 marks the beginning of social housing in Germany. From now on until the 1970s and 1980s, housing is high on the political agenda. The objective is that non-profit organizations erect affordable

and adequate rental flats for large parts of the population. With the Second Housing Act of 1956, the focus shifts to fostering individual ownership especially for lower-income households.

Another trend is that cities and municipalities in Germany start building more public institutions such as own swimming pools or hospitals. All of these – and of course the large social housing projects – must now be equipped with new locking systems.

# CES history in short

## 1840

Heinrich Schulte establishes the enterprise as a lock manufacturing business. Already long before 1840, the official year of foundation, ancestors of the Schulte family were self-employed master locksmiths.



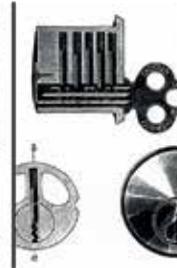
## 1887

Purchase of a larger piece of land on Friedrichstraße and start of the construction of the factory.



## 1896

Beginning of the industrial lock production with one of the first steam engines to be installed in Velbert.



## 1934

CES successfully completes one of the biggest projects in its history: for the new construction of the University of Cologne, CES supplies one of the largest locking systems ever installed worldwide. The grand master key locks 867 cylinders.



## 1960

The new building on Oststraße is constructed. The company specializes in the development and manufacturing of cylinders and locking systems.



## 1968

Niederhoff+Sieper is acquired as a 100% subsidiary.



## 1987

With the construction of the new administration building on Friedrichstraße, CES also leaves a fresh mark in the urban landscape.



## 1990

On the occasion of its 150th anniversary, CES establishes the CARL-EDUARD-SCHULTE foundation which focuses on the promotion of young engineering and scientific professionals. This is targeted at young researchers and engineers who develop future-oriented innovations in the field of locking systems and related manufacturing technologies. By 2015, 74 award winners have been honoured.



## 1857

After the death of his father, Carl Eduard Schulte takes over the operation at the tender age of eighteen and gives it the name the company still bears today.

## 1888

Move into the new factory building located behind the front dwelling house (which later becomes the office building). Entry of the firm C.Ed. Schulte in the commercial register; the company already has 30 employees.

## 1909

As the first German company, CES starts the production of cylinders and one year later manufactures the first small locking systems.

## 1958

The buildings erected in 1908 and in 1920/23 are joined together.

## 1964

The CES branch factory in Herten is constructed.

## 1974

The entire mechanical manufacturing is concentrated in the new branch factory on Mettmanner Straße, Velbert.

## 1988

Acquisition of plots adjoining the main factory and construction of a new machine shop with subsequent combination of all activities and workplaces of the 500 employees in Velbert. Presentation of the first electronically controlled cylinder lock, developed in three years of collaboration with the Fraunhofer-Institut.

## 1996

DIN EN ISO 9001 certification. Launch of the CEMO motor cylinder.

## 1999

CES introduces reversible key technology. CES is granted trademark protection for the key sections WM and KM.

The probably most prominent project in the corporate history, the Berlin Reichstag, is equipped with a CES locking system and dedicated with a key ceremony.



## 2004

Start of the cylinder manufacturing by CESrom srl. in Sibiu, Romania. For the first time, CES is an exhibitor at the BIG 5 in Dubai.



## 2006

The work organization is comprehensively re-engineered with the CES Agile Production. Manufacturing processes are optimized by small and flexible units. An excellent example is the S48 segment, which delivers bespoke locking systems to customers within 48 hours of receipt of the order. CES uses the Kanban method to control the warehouse organization. CES is founding member of the Schlüsselregion e.V. industrial network.



## 2008

Establishment of CESnederland B.V. in Apeldoorn, The Netherlands. Establishment of CESitalia srl. in Neumarkt (Italy). Together with eleven companies and the local authorities of Velbert and Heiligenhaus, CES initiates the Institute for Security Systems (ISS) in cooperation with Bergische Universität Wuppertal. CES delivers locks and cylinders for the Burj Khalifa, the tallest building in the world.



## 2010

Restoration of the historical façade and opening of a small lock museum and a modern show room.



## 2012

Introduction of the electronic locking system OMEGA FLEX, a complete in-house development. Comprehensive alteration and new construction measures in the corporate headquarters aimed at aligning the manufacturing processes even more efficiently. Establishment of the Industrial Engineering department designed to improve efficiency in the entire company.



## 2014

Launch of the vertical reversible key section series WD with undercut. For the first time, the integrated academic and vocational training scheme is also offered for future Industrial Business Management Assistants.



## 2001

Market launch of the electronic security system CES-OMEGA. Key ceremony at the Federal Chancellor's Office.

## 2005

Spinning-off of the electronics division into CESTronics GmbH. Renaming of the lock factory Niederhoff+Sieper to CESlocks GmbH.

## 2007

On the Open Day, employees show their families the new production. Establishment of CESfrance SARL in Paris, France.

## 2009

Launch of the new key design. CES starts the company-wide Continuous Improvement Process initiative.

Since the winter semester, CES – together with the University of Bochum – offers integrated academic and vocational training schemes for engineers (KIA/KIS).

## 2011

Launch of the key section series DU with double undercut for upscale industrial buildings. The Chamber of Commerce commends CES for superior performance in vocational training. Emphasizing systematic innovation management, CES starts the Agile Product Development system.

## 2013

In manufacturing, processes are controlled with shop floor leadership. After the completion of the construction work, the reception and the offices move to their new locations. The new staff restaurant becomes the company's nerve centre.

## 2015

Certification under the DIN EN ISO 50001 standard (energy management system). As part of the celebration of the 175th anniversary of the family-owned business, CES presents the CES Art Award 2015.

# Work like on the assembly line Industry 2.0



Friedrich Schulte



Eduard Schulte



Friedrich Laue

The large-scale building projects of the 1950s to 1980s lead to an enormous demand for state-of-the-art locking technology that cannot be satisfied with the traditional manufacturing methods. The individual processing steps are still carried out at individual machines, each of which only performs a single task, and the transport between the individual steps of the process results in a significant loss of time. The challenge is now to combine more and more operations and bring manufacturing to a smooth flow.

In 1959, CES is under a new leadership: Friedrich Schulte, the son of Alfred, and Eduard, the son of Max, together with Friedrich Laue, the son of Ernst Laue, take over the management of the company. In 1962, the company changes its legal format from a joint stock (or public limited) company to a private limited company. Friedrich Laue now takes a decision that is to set the course for the future development: he resolves to completely give up the production of door locks and make CES a pure cylinder manufacturer. The background: the production of locks is fundamentally different from the production of locking cylinders and requires completely different machinery. It takes several years until this conversion is completed.



Profile cylinder from the catalogue of 1934

By the middle of the 1950s, mainly round cylinders are used that are based on the original Yale patent dating back to 1865. They consist of two parts, each of which is fastened on one side of the lock. Due to the different fastening systems, a round cylinder can only be fitted in a defined type of lock. As a rule, the lock and the cylinder must therefore be made by one and the same manufacturer. The lack of compatibility of this system already in 1928 results in the first patent for a profile cylinder. A profile cylinder consists of a single piece and can be inserted into any lock with an appropriate hole and fastened. Since nearly all manufacturers of locks and cylinders soon take over the dimensions, this yields an amazing number of possible combinations. Already since 1933, the CES range also includes profile cylinders but



Setting up of a key cutting machine

until the decision by Friedrich Laue, they play only a minor part. Laue recognizes the opportunities afforded by this development and decides to focus completely on the production of profile cylinders.

## The signs point to expansion

In 1966 – one year after its 125th anniversary, CES has 385 employees. Now, there are primarily two impediments to further growth: lack of space and lack of skilled labour in Velbert. In the Ruhr area, the mining sector experiences a crisis in the 1960s. Coal mines close their gates and land becomes available for other purposes. In this situation, the CES managers seize the opportunity and open a new branch factory in Herten. It has a size of 8,000 m<sup>2</sup> and is equipped with the most modern machinery for the dedicated production of profile cylinders which starts in 1966. A continuous movement of goods begins between Herten and Velbert – about 65 km away from each other.

In 1968, an opportunity arises to extend the company premises in Velbert. In the immediate vicinity of CES, the lock manufacturer Niederhoff+Sieper has long had its factory. Now, the factory is offered for sale, subject to the condition that all employees be taken over and the production be continued for another ten years. At the same time, the lock factory Wesser und Co. on Mettmanner Straße closes down. CES purchases the property, Niederhoff+Sieper move to their new location and from now on, manufacture locks exclusively for export. CES itself uses the vacated neighbouring premises. In 1974, the entire mechanical prefabrication is combined in the new branch factory on Mettmanner Straße.



Cylinder production in the branch factory Herten as from 1966

New key section series such as the S4000 series – the first key section series to be granted patent protection – allow the production of locking systems of an unprecedented complexity. An effective sales force permits the swift response to new trends and market developments. In the 1970s, the Middle East becomes an important outlet for sales. Especially the Gulf states experience a genuine construction boom as a result of the rising demand for oil. Now it pays off that CES is a one-stop shop for both cylinders and locks – a service which is especially valued by the customers in the Gulf region. The locks manufactured at Niederhoff+Sieper can be delivered together with the CES profile cylinders.



Security certificate of the oldest locking system in use



**Gemeinsam werden wir viele Türen öffnen.**  
(Und selbstverständlich auch sicher verschließen)

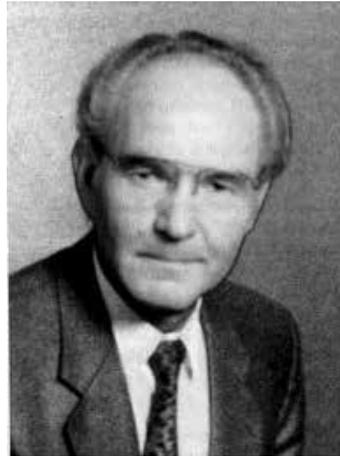
Wir – das sind die Firmen CES und N & S. Gemeinsam wollen wir Ihr Partner sein, wenn es darum geht, Türen – und die Werte, die sich dahinter befinden – zeitgemäß zu sichern. CES liefert Profilzylinder, Schließanlagen, Sonderzylinder und die neueste Entwicklung des Combi-Einsatz-System\* N & S verfügt über ein komplettes Schließprogramm für den Wohnungs- und Behördenbau. Schließanlagen müssen absolut sicher sein. CES-Zylinder garantieren diese Sicherheit (in unzähligen Wohnungen, Verwaltungen, Krankenhäusern, Schulen, aber auch in Privathäusern und an Garagentoren). Türschlösser müssen von solider Qualität sein. Und einwandfrei funktionieren. N & S garantiert beides – im Wohnungs- und Verwaltungsbau. Vertrauen Sie unserer gemeinsamen Erfahrung. Wenn Sie planen, bauen oder umbauen, sollten wir uns kennenlernen. Unsere Fachberatung kostet Sie keinen Pfennig.

\*ein ideales Verschlusssystem, z. B. für Krankenhausbauten

**C. ED. SCHULTE GMBH** 562 Velbert · Postfach 1180  
**NIEDERHOFF+SIEPER GMBH** 562 Velbert · Postfach 626

Joint advertisement of CES and Niederhoff+Sieper

## Change in the leadership



Wilhelm Mertens

In 1981, Friedrich Laue, the last of the manager generation of 1959, hands over the reins to his successors. The change of generations also occasions a fundamental decision. Up until then, all managing directors throughout the history of the firm have been members of the owner families. With the appointment of Wilhelm Mertens and Wilfried Steinbrink, this principle is now dropped. Wilhelm Mertens, who joined the company as an apprentice in 1953 and has long been Friedrich Laue's right hand, now takes over the responsibility for all commercial matters. Wilfried Steinbrink, who came to CES in 1950, becomes the new technical director.



Wilfried Steinbrink

In 1987, the new administration building on Friedrichstraße with its prominent façade is completed. One year later, another opportunity for expansion arises as the neighbouring machinery maker Ruhrmann closes down. As CES is now able to concentrate the entire production in Velbert, the property of the branch factory in Herten is handed over to the subsequent owner. 1988 also marks the beginnings of a new revolution: CES enters the age of electronic security engineering and with the CES-alpha series launches the first electronic locking cylinder.

The administration building of 1987

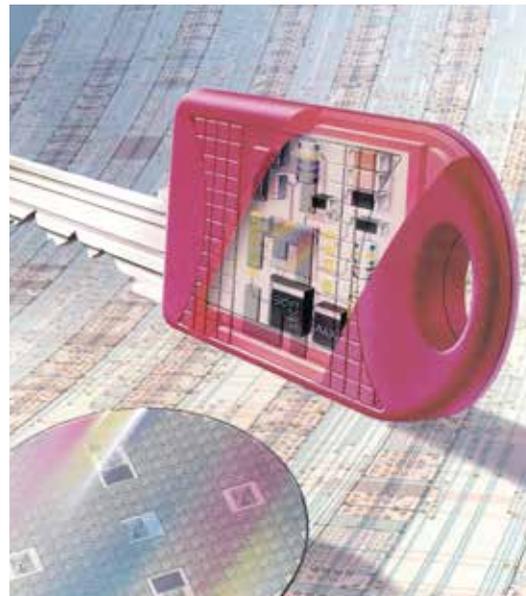


## Electronic security From CES-alpha to OMEGA FLEX

During the 1980s, the users of locking systems increasingly demand more security in case of lost keys and a more flexible organization within the locking system. If a higher order key is lost, a complete locking system may have to be replaced. And with mechanical systems, it is not possible to restrict access to defined time windows. Rather the opposite: anyone who has the key can lock or unlock, every day and at every hour. CES takes on the challenge presented by the market and together with the Fraunhofer-Institut develops one of the first electronic access control systems on the market. Trademarked CES-alpha, it is presented to the public for the first time on the 1988 International Hardware Fair in Cologne.

CES-alpha is also a pioneering innovation because it already comprises an RFID system for the contactless data transfer between the key and the lock – today nearly every electronic access control system works with contactless RFID transponders. The system is battery operated and can therefore – unlike conventional access control systems – be used without cables between the door and the wall. Lost RFID keys can be blocked at any time so the security of the locking system is no longer jeopardized.

Moreover, it is now possible to grant access authorizations for limited periods, and locking cylinders can be automatically switched to Permanent Open mode. The innovative access control system is able to store hundreds of access events that can be read out with a programmer and can be logged. As an additional security feature, it comprises a door monitoring function which directly signals any drilling or break-open attempts to an alarm system.



Electronic access control system CES-alpha

### A true problem solver – the CEMO motor cylinder

1996 is the year of another game-changing development in electronic locking technology: with the CEMO motor cylinder, CES creates the link between locking and door automation. CEMO can automatically lock or unlock doors under its own timer control or in conjunction with other electronic control systems such as fire alarm systems. The fitting of the CEMO on a locking cylinder permits the combination with virtually every lock and hence virtually every door. While before, caretakers or security staff sometimes had to walk long distances to lock or unlock doors, this job is now taken over by the CEMO motor cylinder which at the same time monitors the reliable locking of the doors required by the insurance companies.

In a logical development of the CEMO, CES launches a fully automatic version of the motor cylinder in 2000. Now CEMO is able to learn its function on the door at the push of a button. With the patented self-learning function, configuration and setting work

during the installation is no longer required which makes for especially simple and quick fitting. The continuously optimized CEMO motor cylinder is a success story and is still being marketed today, also through several competitors.



CEMO motor cylinder

**The best of both worlds:  
CES OMEGA becomes a top seller**

Shortly after the turn of the millennium, CES enters a new dimension of the electronic locking technology with CES OMEGA. Through the miniaturization of components and a high-capacity micro-electronic control system, the development engineers successfully integrate an electronic access control system with a mechatronic locking cylinder. All electronic components and the batteries are accommodated at the locking cylinder and inside the knob. The key combines the full mechanic locking function with additional electronic functions on the basis of the 125 kHz RFID system that is customary at the time. The applied technology and an intelligent mechanical probing of the key ensure a smooth locking operation with simultaneous reading and authentication of the code. CES secures this technological advantage by several patents. In the years to come, further elements of the range are successively added, such as double-knob cylinders and wall terminals as well as software for the creation and management of electronic locking plans.

Trade fair stand

**Win-Win situation with  
a competitor**

In 2004, a crucial extension of the OMEGA system is accomplished through the collaboration with a competitor, which is rather unusual in the lock and fitting market. Together with and for Kaba, CES develops and builds a new double-knob cylinder on the basis of the LEGIC identification system. The purchase of a LEGIC A partner licence now allows further innovations and extensions of the product portfolio. OMEGA LEGIC becomes an international top seller because it permits the integration of the locking function with complex access control, time management and accounting systems, all of which are operated by one and the same electronic CES key.



**Security through a wireless  
online system**

In 2007, CES responds to the market demand for ever increasing convenience and flexibility with the first wireless online system OMEGA ACTIVE. The development is based on the 125 kHz RFID systems already in use since 2001 which are now combined with 868 MHz radio frequency components. CES rises to a particular challenge by adapting the keyless entry function known from the automotive industry. A single battery of the type nowadays used in digital cameras supplies the system with power for up to 40,000 operating cycles – in cars, a significantly higher capacity is available for this purpose.

CES locking cylinders are able to read and interpret the OMEGA ACTIVE key from large distances of up to 80 cm (the standard RFID distance is only 2 cm). Also the hands-free control of barriers in access drives or automatic doors is possible – it is not even necessary to remove the key from the pocket. A special function is the use of the radio frequency to link the system components with a central control computer.

An Access Point, which can be as far as 20 m away from the door, receives the RF signal from the locking cylinder and forwards it by wire to the computer. Doors with OMEGA ACTIVE can be addressed and pro-

grammed wirelessly from anywhere in the world or can supply information on access events and door status within fractions of a second. It takes only seconds to disable a lost key without having to go to any door for programming. Nationwide, mechatronic access control systems with many hundreds of doors can for the first time be implemented with a central access management. Over the past years, thousands of doors of large companies and local authorities have been equipped with this system.



**The next evolutionary stage:  
OMEGA FLEX**

In 2012, the know-how gained over the years in the development of mechatronic components and various identification and radio-frequency online systems leads to another step in the evolution. With OMEGA FLEX, CES presents a state-of-the-art electronic access control system that is suitable for nearly every door or locking device in buildings. Only half the size of its predecessors, OMEGA FLEX has twice their performance and in addition is extremely convenient to install.

All functionalities – from a simple offline system through to a globally accessible wireless online system – are combined in one and the same hardware and can be licensed and enabled as required. A single, battery-operated cylinder can, for instance, manage up to 5,000 persons with individual time profiles or record as many as 2,000 locking events. The next generation is already in the pipeline and will become another milestone in the history of electronic locking systems by establishing the link with mobile communication systems.



Security 2015 trade fair



# Electronics sets the pace Industry 3.0

Even at the beginning of the 1980s, it is still a long way to the finished locking cylinder – too long for the requirements of a modern production operation. It all starts with a brass bar of a length of about three metres. To turn it into a cylinder body (or hull), about twenty operations such as cutting to length, milling, and boring are required. The technical director of CES, Wilfried Steinbrink, leaves no stone unturned to promote automation and make the production more efficient. After a long search, he finds a partner in Switzerland who adapts a standard machine to the special requirements of the cylinder production. For the first time, several operations can be automatically performed by one machine. On a rotary table, the workpiece moves from station to station and

then is conveyed by a lift to the next automatic machine. A machine is also developed for the automatic assembly of the cylinders with their delicate springs and pins, which has always been a manual and correspondingly time-consuming process. A decisive step is the introduction of electronic control systems allowing the loading of different programs within minutes. This is quite an advance over the predecessors: electro-mechanical control systems were already used in the factory in Herten but these had the size of a wardrobe and their programming took a full day!

*Technological advances also increase the momentum of the industrial development. While in the early phases of industrialization, it took decades to move from one stage to the next, the manufacturing methods now change within a few years. This is primarily the result of further automation through the integration of electronics which is able to control machinery and processes with high accuracy and enormous flexibility.*

# Electronic data process The engine of efficiency

Starting at the end of the 1980s, the technological change enters more and more departments and jobs: in 1988, the first personal computer is installed in the secretariat of the technical director. Also in the calculation of the locking plans, electronic data processing allows a giant leap forward. While previously, the complex plans had to be laboriously prepared on index cards, the production files can now be transmitted over a PC network.

This period witnesses another far-reaching political turnaround – this time towards the better: in November 1989, the fall of the Berlin Wall marks the end of the division of Germany and on 3 October 1990, Germany is reunited. The economic reconstruction of the former Eastern Germany generates a huge demand for security engineering. Also the new democracies in central and eastern Europe soon become important sales markets.

At the same time, the technological upgrade continues. In 1994, CES installs the first CAD workplace in the design department. In the following year, also the sales department is connected to the electronic data processing. To keep up with the rising demands on production and management, Quality Management is the dominant theme of 1995. A ten-point programme defines binding guidelines and obliges every employee to pursue a continuous optimization of products and services. Simultaneously, the quality standards along the value chain are examined by external auditors.



Certification of the AGQS

CES achieves certification under the DIN EN ISO 9001 Quality Management standard and later under the DIN EN ISO 50001 Energy Management standard. Regular repeat audits are performed by AGQS-Qualitäts- und Umweltmanagement GmbH in Remscheid. Numerous CES products also gain certification confirming that they satisfy the requirements of VdS Schadenverhütung GmbH and the Dutch SKG.

## Change of generations triggers innovation boost

In October 1996, after 46 years of service and 15 years of leadership responsibility, Wilfried Steinbrink hands over the reins to Dr Alexander Stefanescu, who modernizes and significantly extends the product offering of conventional locking systems. An important milestone is the introduction of the reversible key technology in 1999 which opens up a new field of activity for CES.

Wilhelm Mertens, who has also shaped CES for nearly half a century, retires as managing director on 1 July 2002 and is succeeded by Eckart Leptien, general sales manager since shortly after the turn of the millennium. On 1 March 2005, Richard Rackl joins the company and one year later is appointed managing director with responsibility for technical matters, while Eckart Leptien continues to head the commercial management. Since April 2013, Richard Rackl is the sole managing director.



Dr. Alexander Stefanescu



Eckart Leptien



Richard Rackl

In parallel to the changes in the management team, the first decade of the new millennium is also the time of a number of far-reaching organizational decisions. With the downturn in the German construction activity, the attention is increasingly focused on the export business. In 2004, a cylinder manufacturing site is opened by CESrom srl. in Sibiu, Romania. In 2007, CESfrance SARL is established in Paris, followed one year later by CESnederland B.V. in Apeldoorn and CESitalia srl. in Neumarkt.

All this time, the electronics division becomes more and more important and in 2005, it is spun off into the separate subsidiary CEStronics. The CES subsidiary Niederhoff+Sieper changes its name to CES locks and is now the centre for the entire product range of industrial building locks, bespoke lock solutions for special requirements and special locks. All of the above are headed by CES-Gruppe as the group holding with a modern and high-powered sales management and management accounting/controlling.



CES-Gruppe with its foreign branches

## Code word “Agile Production”

2005 also sees the beginning of a systematic innovation and optimization process that involves the entire company. The objective: enable the company to respond swiftly to new market and customer requirements and develop marketable innovations within a narrow time frame. From now on, teams of product managers, sales experts and developers engage in a cross-functional cooperation and jointly define the requirements on a new key section series or access control system.

In the years that follow, CES successively implements strategies that have already been tried and tested in the motor industry. One example is parts commonality: in analogy to the model strategy for cars, identical or similar modular components are designed for products of different series. This reduces the number of different components and at the same time lowers the costs of developing new machines and tooling.

Innovative concepts are also introduced in the production domain. In 2006, CES re-engineers its work organization under the code word “Agile Production” from workshop production to segment production. From milling the profile through to finishing the final cylinder, the entire production process is now handled by small and flexible units, the “segments” as they are called. This allows a more effective design of the workflow and increases the value creation.

The way that a locking cylinder has to travel from prefabrication to finishing can be reduced to one tenth. Backlogs in the order processing are avoided, delivery periods are shortened and the adherence to delivery deadlines is significantly increased. The result is something of a revolution in the industry: while the average delivery periods are six weeks or more, CES customers can now receive individually manufactured locking systems with at first 20 and nowadays even 100 cylinders within 48 hours of the receipt of the order.

Also the processes in the warehouse and the materials management and control are completely reorganized. The Kanban method, which is based on the actual consumption of parts, allows a significant reduction of the inventory levels and hence the inventory costs. Moreover, newly developed components can be integrated more quickly in the production chain.



Example of one of the new production segments

## „We are Family“

**From its beginnings, CES has been a family-owned enterprise, and the familial atmosphere still characterizes the corporate culture at CES. This is also reflected in the low employee turnover rate. Many employees stay their entire working life with CES, from training to retiring. And it is anything but rare that also the children of employees join the company so that several generations work side by side. The following brief profiles of three different families show CES as a family business from a different perspective.**

### The clan of the toolmakers

CES has been a part of Tina Sodtke's life as long as she can remember. Although she was born in Essen in the northern part of the Rhine-Ruhr metropolitan area, her childhood is full of stories about the company in the Berg region, the fascinating work of her father Rolf Sodtke as a toolmaker and the impressive machines in the plant. These close links to the company are also proudly shown by the "CS" selected as the middle part of the family car registration number.

At the age of sixteen, Tina starts her own career at CES with a vacation job in manufacturing. She instantly likes the familial atmosphere and begins an apprenticeship to be trained as an industrial business management assistant, adding yet another member to the Sodtke family clan at CES. Already her grandfather Fritz Sodtke Senior had been with CES, working as a lock maker for thirty-five years,

from 1949 to 1984. His three children Fritz Junior, Rolf and Marion, followed their father's footsteps and likewise began their careers at the Velbert location.

Fritz and his brother Rolf later trained generations of apprentices in the art of toolmaking. Rolf was also heavily involved in re-engineering the work organization from workshop to segment production. Today, Tina works in Marketing, and also Dirk Seim, a cousin on the mother's side, has found his professional "home" at CES. Tina Sodtke is confident that she can pass the baton on the next generation – her son Nico already plays extensively with keys made by CES.



### From the bottom up – and sometimes with a detour

Also for Bernd Becker, the term family business has a special meaning. Already at the age of fourteen, he takes on a vacation job with CES to finance his dream of his first own racing cycle. Three years later, in 1987, he begins his training as a toolmaker in the press and metal forming shop of CES. At that time, his father Kurt has already been with the company for seven years, serving as personnel and finance manager. That, however, does not mean that Bernd enjoys preferential treatment – he has to work just as hard as everybody else. After completing his apprenticeship, Bernd Becker leaves CES, albeit only temporarily.

He goes back to school, gets his university entrance certificate (Abitur) and studies Mechanical Engineering, working enthusiastically as a tour and alpine guide on the side. In 1997, he starts his second career with CES, this time in Technical Sales. Today, he is Sales Manager responsible for Germany, Austria, Switzerland and the Netherlands.

Also Bernd Becker has – although without any direct involvement – recruited a junior professional from his own family. While still at school and on the home stretch for his Abitur, his nephew Yannick Poeste visits the annual apprenticeship fair of the Schlüsselregion network and finds what he is looking for at CES. In 2014, he starts his vocational training as an industrial business management assistant in combination with a university course in International Management.

When so many committed and competent people join the company and extend the staff family – whether taking the straight route or with a detour – CES need not worry about the future.



### Reunification at CES

Andreas Schmidt is a true all-round man. A trained shop fitter, he works as a setter at the CES key machining centres. Here, he makes sure that the key machines keep running smoothly. But he can also operate nearly every machine in the cylinder lock production department. Ever since joining the company twenty-six years ago, he has liked the varied and multifaceted work at CES. His wife Simone, who also assembles locking cylinders, is equally versatile and can meanwhile look back on twenty-six years of service.

Then there are sister Simone and brother-in-law Jahn Czech who have been with the company for a similarly long time and both work in the assembly segment for furniture and industrial cylinders. And last but not least, there is Horst Schmidt, the father: he started working in the final control department of CES in 1994, and then was "head key keeper" in the master key system assembly shop until his retirement in 2003.

Theirs is a family story of the special kind, which also reflects a chapter of German history. It all begins in Plauen, the capital of the Vogtland, a region reaching across Bavaria, Saxony and Thuringia and into the Czech Republic, i.e. most of it is in the "East". In Plauen, Andreas Schmidt works in a lace weaving mill together with his future wife Simone.

He and his parents want to leave the GDR and in 1985 apply for exit visas. It takes almost four years, until the spring of 1989, before the visas are finally issued. Andreas' girl friend, then eighteen, wants to follow him as soon as possible. She is granted an exit permit in September 1989. Also Simone and Jahn Czech, the sister and brother-in-law of Andreas Schmidt, want to leave the country. But all's well that ends well: in October 1989, Andreas Schmidt can celebrate his fiftieth birthday with his loved ones.

The family finds refuge in Velbert, where a cousin of the mother lives. At first, they have to live in very cramped conditions and the beds can only be used in shifts. The transition into the new life is everything but simple but that only reinforces the family ties. While all members of the family used to work in the textile industry before, they now one after the other find employment at CES. The first to do so is Andreas Schmidt in March 1989. An experienced maintenance engineer, he applies for a job with CES and can already start the very next day.

In 1995, the family reunification is complete, now also jobwise. That they are all together again, even strengthens their sense of community. "The advantage is that we can discuss during the lunch break what we'll put on the grill in the evening," says Andreas Schmidt and continues to praise the solidarity with the other colleagues in the company. "Everyone is there for the other, sharing the good and the difficult times." says Andreas Schmidt and continues to praise the solidarity with the other colleagues in the company. "Everyone is there for the other, sharing the good and the difficult times."

A shadow only falls on the Schmidt-Czech clan when it's about sports: Andreas Schmidt is a fan of FC Bayern while the heart of his brother-in-law belongs to Borussia Dortmund. But during their next joint fishing trip at the latest, all disputes are settled again.



Horst Schmidt Simone Czech Jahn Czech Simone Schmidt Andreas Schmidt

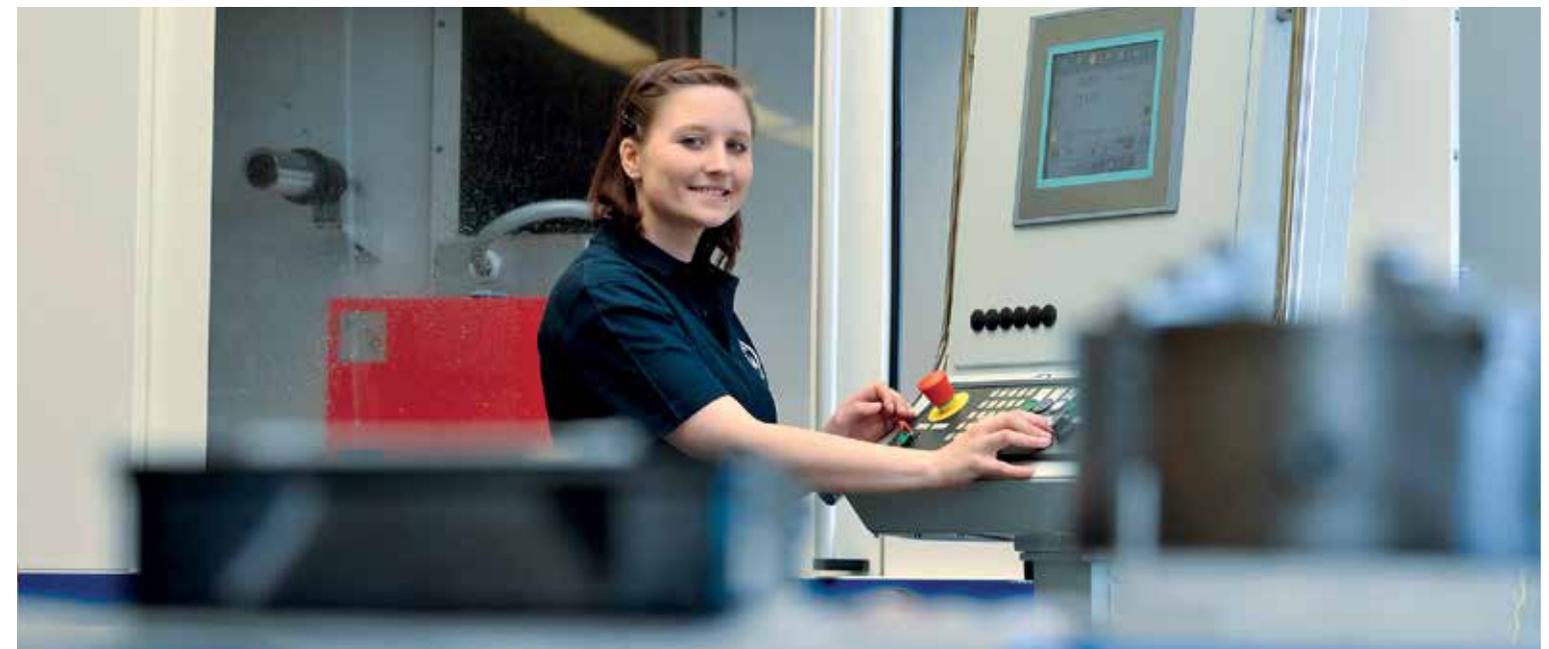
## Long-term investment in training and promotion of junior talent

For the employees, the focus on innovation and efficiency means more self-initiative, more responsibility and more teamwork. Early in 2009, CES launches a company-wide employee initiative. It is aimed at triggering a Continuous Improvement Process in which the CES-employees fine-tune all product development, manufacturing and sales processes to the customers' desires and thus steadily enhance the innovative capacity and performance of the company. To maintain and build on the knowledge advantage in the field of mechanical and electronic locking systems, CES also invests systematically in the training of skilled personnel. In 2011, the company establishes its own CESakademie. Experienced executives and specialists train their colleagues on subjects such as network security and cloud computing just as on business topics or the corporate strategy. The objective is to pass on the knowledge available in the company in a structured approach so that the core competencies are secured in-house for the long term.

The "search for the brightest minds" is not only pursued in the skilled crafts and trades but also in the field of engineering. Since the winter semester 2009/2010, CES offers a now nine-semester programme of combined academic and vocational studies in Mechanical Engineering and Mechatronics in collaboration with the University of Bochum. Mechatronics can also be combined with Information Technology. Within this „cooperative engineer training“ (KIA) scheme, practical phases with CES alternate with study periods on the Velbert/

Heiligenhaus campus. The young academics graduate with a Bachelor of Engineering degree as well as a craft certificate. As an alternative, talented youths are offered an internship with CES in parallel to their university education under a „cooperative engineering studies“ (KIS) programme. Additional training and study opportunities follow over the years.

CES is also a founding member of the industrial network "Schlüsselregion" (literally: key region), together with eleven other companies from the region and the municipalities of Velbert and Heiligenhaus. The vision of the founding members is the establishment of an institute where practical research in the field of security and fitting engineering is pursued in a collaborative spirit. This is to enable a speedy translation of scientific findings into new technologies, processes and services. Since 2009, the Institute for Security Systems (Institut für Sicherungssysteme, ISS) drives the interdisciplinary research in cooperation with Bergische Universität Wuppertal and promotes the networking and the knowledge transfer with partners from the entire value chain.



# Go-ahead for the Masterplan 2020

CES lives on innovations, on the continuous further development of its products and services. Information technology is the main driver, now more than ever before – and the demand for qualified IT experts, electronic engineers, software programmers but also sales specialists grows accordingly. CES responds to this trend with a project called the Masterplan. It is intended to create the space and work organization prerequisites for an optimum support of the main functions of manufacturing and administration in terms of collaboration and communication. 2009 marks the starting signal for a major alteration and new construction of the corporate headquarters.

The historical façade is restored and inside, a small lock museum and a modern show room are created to give partners, customers and visitors an illustrated account of the company's development over the years. The former goods receiving area is converted and becomes the new entrance to the factory. This is followed by a comprehensive refurbishment of the staff restaurant building and its conversion into offices. In 2013, the staff move into the new modern offices, and in November of the same year, the new staff restaurant is opened – the company's nerve centre, serving as a central communication hub and meeting point for the CES employees.



Inner courtyard with historical façade and new entrance portal



Opening of the new staff restaurant



Show room and conference room

To implement the work organization side of the Masterplan, CES introduces a systematic shopfloor leadership and control that focuses on the processes at the place of the value creation. In daily shopfloor rounds, those responsible for manufacturing, warehousing, and operations scheduling jointly monitor indicators such as adherence to delivery deadlines, equipment availability, setup times and appropriate material inventories. They identify deviations from the standard and work out possible solutions directly on site. This management process is controlled and developed by the Industrial Engineering department which from now on is responsible for increasing the efficiency in the entire company.

# Highlights of the anniversary years 1965 – 1990 – 2015

## 1965

At its 125th anniversary, CES presents itself rejuvenated, both externally and internally. The old boiler house and its chimney – both a symbol of the industrial revolution for many decades – are replaced by a modern factory building. Also the entire machinery is brought up to date. The anniversary publication states: “The machine has become the characteristic feature of the era of technology and automation.” In October 1966, Friedrich Laue, Eduard Schulte and Friedrich Schulte hold an official anniversary reception in the Velbert community centre. The North Rhine-Westphalian Minister for the Economy, Small and Medium-Sized Enterprises and Traffic, Gerhard Kienbaum, holds the official speech, the mayor of Velbert, Hans-Otto Bäumer, and other notables pay tribute to the merits of the company. A highlight is the musical performance by the company choir.

## 1990

On the occasion of its 150th anniversary, CES establishes the CARL-EDUARD-SCHULTE foundation which focuses on the promotion of young engineering and scientific professionals. This is targeted at young researchers and engineers who develop future-oriented innovations in the field of locking systems and related manufacturing technologies. Every year, the foundation awards a prize for excellent diploma theses. By 2015, 74 award winners have been honoured and received a total of 135,000 euros in prize money.

## 2015

For the 175th anniversary, the CES Art Award is created. In an eight-months’ project, students of the Hochschule der Künste im Sozialen (University

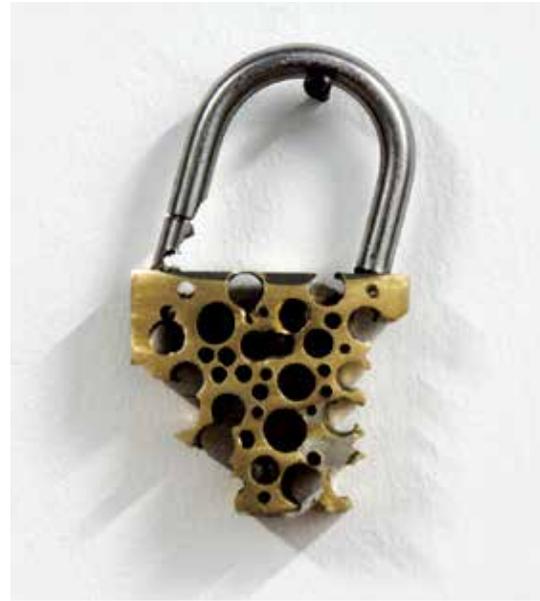
of Art in Society) in Ottersberg design pictures, videos and installations around the central CES themes of “locking, securing, key and lock”. The resulting works of art represent creative interpretations of the different dimensions of locking and unlocking. “The unusual approaches taken by the artists help us challenge and go beyond our customary patterns of thinking”, says managing director Richard Rackl. A jury of artists, university representatives and the company selects four of the presented works of art that are honoured as part of the CES anniversary celebration with its employees on 13 June 2015. In addition, the CES employees vote on an audience award.

The presentation of the CES Art Awards is a highlight of the anniversary celebration, to which all CES employees and their families are invited. Including those from the CES branches abroad, about 1,000 guests find their way to the completely rebuilt corporate headquarters. Historical exhibits and documents bring the past to life, factory tours allow a view of the modern production. Managing director Richard Rackl and the chairman of the works council, Peter Klohs, take their audiences from the past to the present and into the future. In their speeches, they not only praise the circumspect governance by the shareholders, the members of the advisory board and the management, but in particular highlight the performance of the CES employees. As Peter Klohs succinctly puts it: “Without you, dear colleagues, all of this would be nothing.”



Professor Hans-Georg Schnürch during the presentation of the CES Art Award 2015 with the students Florian Münchow, Ariane Holz, Leonie Nowotsch, Meng Li and Nils Rüdiger

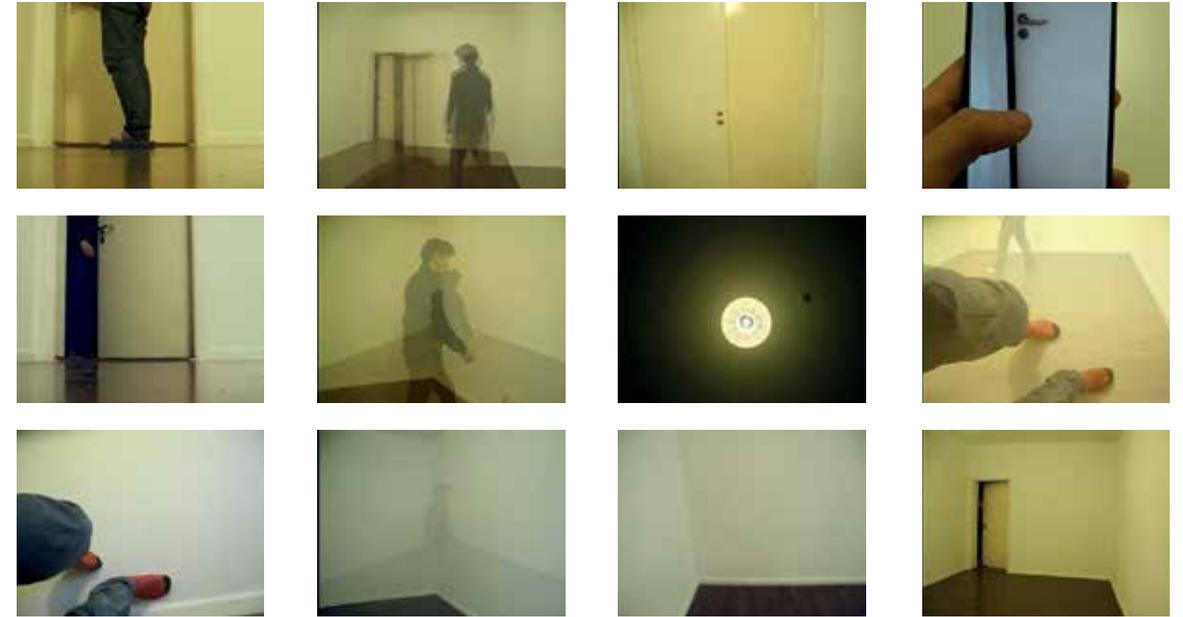




1st prize: Florian Münchow



1st prize: Ariane Holz



3rd prize: Meng Li

The award-winning works of the CES Art Award 2015 of the students of the Hochschule der Künste im Sozialen, Ottersberg  
For the exhibition, a catalogue showing the works of 18 students is available.



2nd prize: Leonie Nowotsch



Audience award: Nils Rüdiger

# The way to the smart factory Industry 4.0

Interview with Richard Rackl by copywriter Silvia Brauner, Düsseldorf



**In the transition to the fourth industrial revolution, the real world and virtual reality grow ever closer. The dramatic change in the production technology results in an increasing customization of products, an integration of customers and partners in the business process and a close link between production and service – challenges to which CES already rises today. In the interview, managing director Richard Rackl explains how the company continuously re-invents itself any yet remains true to its values and principles.**

***From the beginnings of the industrial revolution to the digitization of all parts of life and work – what are the most important constants that have shaped the company over such a long time?***

**Richard Rackl:** A decisive factor is that CES has remained a family-owned business for seven generations – independent of a large group. We pursue a long-term strategy and do not take ad-hoc decisions that might for example lead to giving up or selling off product fields from one day to the next. Our customers can be sure that they will obtain replacement cylinders and keys for their locking systems even after twenty years. I believe that it is this high level of continuity, security and reliability that our customers appreciate most. Added to this is the cooperation as partners and in the spirit of trust that has characterized our customer relationships for many years.

***Starting from this sound basis of its relationships with its customers, how will CES develop on its way to the “Smart Factory”?***

**Richard Rackl:** Our customers appreciate short delivery periods. That is why our 48-hour delivery service has become such a success. The question is now: How can we improve our response to this customer requirement. This is where Industry 4.0 comes in: It will enable us to get even closer to our customers, offer an even more customized service and deliver unique locking systems even faster. The web shop especially developed for CES will permit our customers to access our machining centres over the Internet. The locking plan prepared by the customer will in several steps be automatically translated into a software programme e.g. for cutting a key. Also the setting-up of the machining centre will be automatically derived from that data record. So product-related data will be passed on from one technical system to another, which will allow even more efficient processes.

The next move to drive Industry 4.0 at CES would be to use the data that are transmitted online to control the jobs throughout the entire production chain and thus interlink the individual steps in the manufacturing process.

***What are the changes that Industry 4.0 will bring for the employees?***

**Richard Rackl:** Apart from the automated distribution of production data among various machines, the future will see an interactive networking of man and machine.

For the manual assembly of locking cylinders and locking systems, diverse information on jobs and products is required. Today, the employees read out the relevant data from various sources and also call up a great deal of accumulated expertise. As part of Industry 4.0, the employee will automatically receive the related digitized information on the product. This will not only include the data that are already provided today but also additional details such as drawings, assembly instructions or animations.

The objective is for people to work interactively with a system, drawing support as required by their respective skills and knowledge but also giving feedback on job status or problems. The focus will be on the direct support and integration of the employee in the production process.

***What are the challenges that CES will have to face in regard of the product function?***

**Richard Rackl:** With a view to Industry 4.0, the future will lie in the digital networking and intelligent communication between locking systems and smartphones. In the field of home health care, we have already installed corresponding systems. Individual, temporary access authorizations for a certain door can be sent to the smartphone of the nurse or doctor. This technology also holds great promise for the letting of holiday apartments or furnished apartments for business people. The physical handover of the key is no longer necessary, and also a lost key is no longer a problem. The locking authorization is simply transmitted to the smartphone once payment has been received and is withdrawn at the end of the rental period.

With the transition from the physical key to the digital key via the smartphone, we are taking a technological quantum leap – from a piece of metal with a milled locking code to an invisible virtual access authorization. And that is also mentally a giant step in the development. We want to carry the trust in the security and reliability of the mechanical solution into the digital era. Especially in the world of bits and bytes, these values are more important than ever.



The CES staff in the summer of 2015

## IMPRINT

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## SOURCES

Most of the sources used for this anniversary publication were found in the CES archives, for example, the publication for the 125th anniversary as well as minutes, announcements and photos. In addition, contemporary witnesses were interviewed and reported on their experience.

We would like to thank all active and former employees who have contributed to this anniversary publication and "brought it to life".

### Picture credits

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„Titelfoto Schloss-und Beschlagmarkt Magazin“  
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