

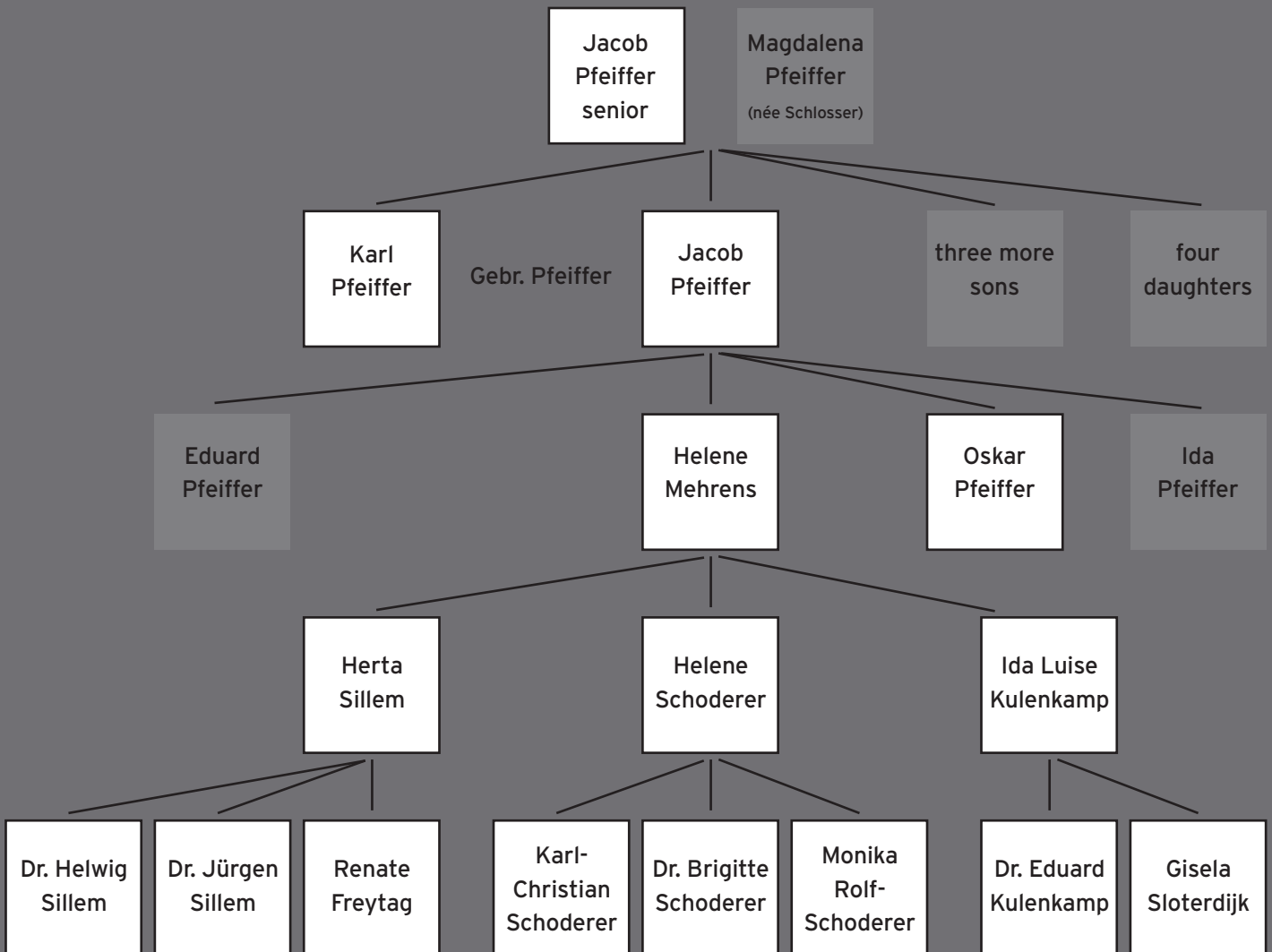


PROGRESS IS OUR TRADITION

150 YEARS GEBR. PFEIFFER
1864 - 2014



GEBR. PFEIFFER - A FAMILY COMPANY



PROGRESS IS OUR TRADITION

**150 YEARS GEBR. PFEIFFER
1864 - 2014**

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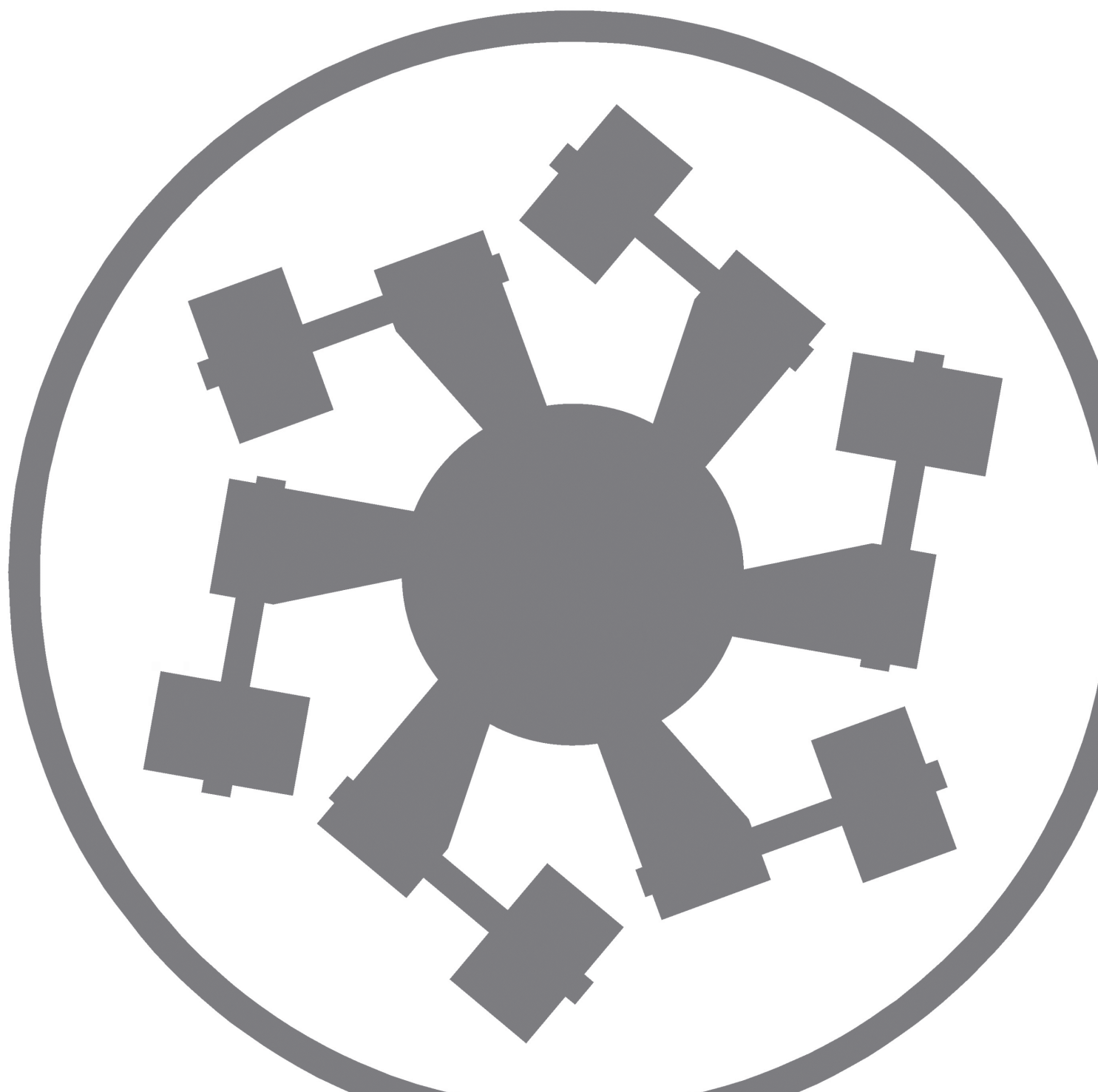
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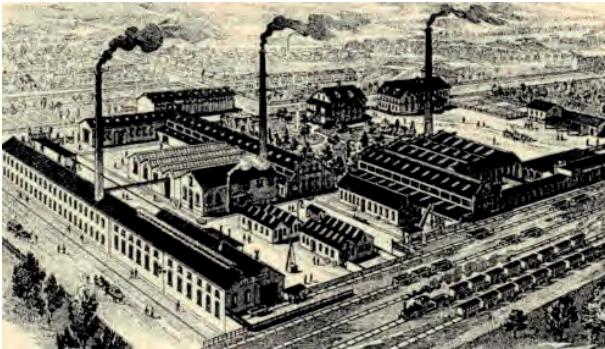
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Progress is our tradition



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The executive board members Gerold Keune and Dr. Ing. Robert Schnatz standing beside the bust of the company's founder Jacob Pfeiffer, February 2014.

Dear Readers,

With this book we would like to thank all of you for your loyal custom and commitment to Gebr. Pfeiffer.

This year we can celebrate the company's 150th anniversary not only because our management has always proven its entrepreneurial skills but also because there is a Pfeiffer gene which is passed on over generations by owners, company managers and employees, a gene that becomes evident in the company's particular orientation towards markets and customers.

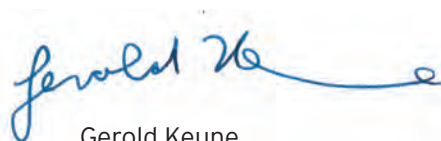
Reliability and straightforwardness are values highly esteemed in Pfeiffer's corporate culture. In fact the development of the company in the long term has always been more important than any short-term success. Due to our long-term orientation, we also place technical innovations on the market that require a great power of endurance. What proves us right are such superlatives like "first mill", "biggest mill", "premium workmanship", and "longest service life" that can be found all through our company history. Hence it is not a coincidence that in the anniversary year 2014 the biggest cement mill in the world - a Pfeiffer mill - is being set up in Brazil.

The history of our company is also characterized by loyalty and a down-to-earth attitude. In fact, 150 years after its foundation, the company is still owned 100 per cent by the founders' family and the works premises are still to be found on the original site where the factory was built. And we are proud that many of our employees have been working for Gebr. Pfeiffer for 25, 40 or even 50 years and that fathers and grandfathers of our staff also worked with us. And last but not least we have valued customers who have been relying upon our technology and machinery for decades.

With this book we look back on the company history, discovering brilliant achievements and milestones but also dark hours. All of these experiences teach us that we should not sit back or "rest" as our founder used to say, but continue striving for adapting our company to any future requirements of our customers, business partners, employees and owners in accordance with the well-proven Pfeiffer philosophy "Progress is our tradition".

We hope you enjoy reading the history of our company.

GEBR. PFEIFFER SE
Executive Board



Gerold Keune



Dr. Robert Schnatz

CHAPTER 1

ON THE MOVE - FROM THE MECHANICAL WORKSHOP TO THE MACHINE BUILDING FACTORY 1830-1880

Kaiserslautern in the mid-19th century: the town is moving towards industrialization, with factories set up by entrepreneurs willing to take risks and keen on experimenting. One of these pioneers is Jacob Pfeiffer Sr whose sons Karl and Jacob found the company Gebr. Pfeiffer in 1864. At the beginning, the two brothers have 20 employees and as much as 10 machines in their factory. In the early years of their business, they concentrate on the building of steam engines, mills, and malting equipment.



When a "mechanikus" becomes entrepreneur - the primordial cell of Gebr. Pfeiffer

Jacob Pfeiffer Sr (1809 - 1888) is in fact this "mechanician" who is considered the founder of the machine building industry in Kaiserslautern in the mid-19th century. Born in Thaleischweiler some 30 kilometers away from Kaiserslautern as son of a miller, Jacob becomes a locksmith. In 1830 he comes to Kaiserslautern and is hired by a master locksmith with the family name Schlosser - the German word for locksmith - as it so happens. His employer, member of a very old Kaiserslautern family, has a 26 year old daughter who seems to be very fond of young Jacob ... On June 1, 1837, Jacob Pfeiffer and Magdalena Schlosser (1811 -1872) get married, with five sons and four daughters resulting from this marriage. One year later, they move into a little house with a yard and garden located in Scheidgasse.

As many other company founders alike, Jacob Pfeiffer was not born in Kaiserslautern but this town offers him the starting ground for his entrepreneurial spirit. In fact, personalities like him help develop Kaiserslautern from the mid-19th century into one of the most significant industrial sites of the Palatinate, focusing on iron and metal industries. Ranging among the biggest and most important factories that are founded in Kaiserslautern, the following three must be named: the so-called "Kammgarn" which is a combed yarn spinning mill, the Pfaff sewing machine factory, and the Eisenwerke Kaiserslautern, an iron factory.

Jacob Pfeiffer Sr has been using his father-in-law's workshop to design and construct his machines for 20 years. The young man is enthusiastic about modern technology and succeeds in participating in the very first trade fair to take place in Kaiserslautern in 1843 where he presents a brick press, a lathe, a big fire engine, and two smaller manual fire engines. For all of these products, young Jacob is congratulated by a constructing engineer from the Kaiserslautern municipality who praises the "impeccable" quality of the big fire engine as well as the "excellent" performance of the manual fire engines.

In 1848 Jacob Pfeiffer Sr starts his own business with a view to becoming independent. In fact he sells his premises in Scheidgasse and buys a house with a building lot and yard in Fröbelstraße (named Neue Straße at the time) where he sets up his own mechanical workshop for the manufacture of fire engines, brick presses and lathes as well as agricultural equipment. In 1857 a far-reaching decision is made: Jacob Pfeiffer Sr, who is respectfully



Jacob Pfeiffer Sr called "Mechanikus" is active as an entrepreneur in the 1840s already. He enthuses his sons Jacob and Karl about mechanical plants and machine building. His iron foundry becomes the primordial cell of Gebr. Pfeiffer and is still part of the company premises today.

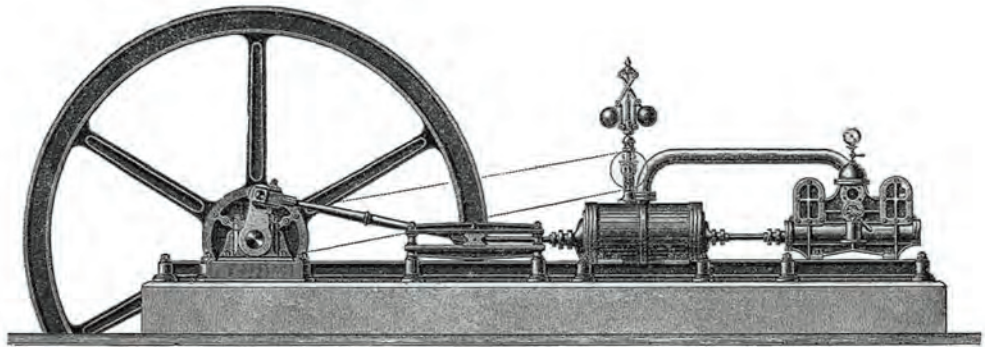
called "Mechanikus" during these early years already, applies for the concession from the Kaiserslautern municipality to set up a firmly installed steam boiler. He actually obtains this concession. However, he is denied permission two years later to set up a small cupola furnace for melting metal. Apparently the city fathers fear that this might be detrimental to the neighborhood.

It is then that Jacob Pfeiffer Sr starts looking for an appropriate site on the eastern border of Kaiserslautern: he is the first entrepreneur in Kaiserslautern to buy a piece of farmland outside of town at the foot of Betzenberg where industrial sites are permitted by the municipality. Most importantly, the site is close by a railway line. Constructed between 1847 and 1849 and connecting Ludwigshafen on river Rhine with Bexbach (in the coal mining area of today's Saarland), this railway - named Pfälzische Ludwigsbahn after King Ludwig I of Bavaria - crosses the Palatinate from east to west, with connections to railway lines all over the country - hence an important driving factor to give momentum to the young industry in Kaiserslautern.

In 1862 Jacob Pfeiffer Sr obtains the concession for his new iron foundry which becomes the primordial cell of Gebr. Pfeiffer. This foundry still exists on the works' premises today. Soon after the foundation, 26 employees work for the company which produces 400 tons of cast iron per year. In 1864 the two sons of Jacob Sr, Karl and Jacob, receive the entire premises with buildings as a gift from their father. The elder son Karl (1832 - 1901) has learnt the trade of a locksmith in his grandfather's workshop but it is in fact his younger brother Jacob (1842 - 1919) who should eventually leave his mark on the company founded in 1864.

Machine building factory Gebr. Pfeiffer

In 1864 the machine building factory Gebr. Pfeiffer is founded by Karl and Jacob Pfeiffer. The two brothers set up workshops on the company premises and 20 employees start working in this factory on January 1, 1866. As the two founders feel deeply attached to their home town of Kaiserslautern, they decide later on to add the supplement "Barbarossawerke" to the name of their company. To be noted that "Barbarossa" (meaning "red beard") was the byname of the medieval Emperor Frederick I who had an important castle built in Kaiserslautern in 1158.



Whether firmly installed or mobile, steam engines are part of the production program of Gebr. Pfeiffer during the early years of business. Giving impetus to the industrial revolution, they are needed in all sectors.

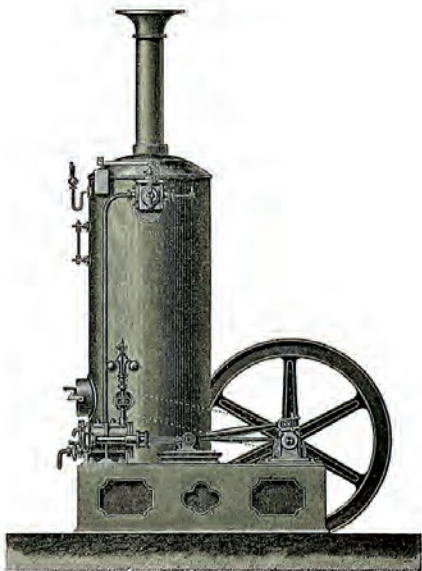
In the beginning, the machine building factory consists of a machining workshop and a blacksmith's shop. The iron foundry set up in 1863 would also be handed over by Jacob Pfeiffer Sr to his sons Karl and Jacob ten years later. Together with a friend residing in Budapest, Jacob Jr introduces the so-called "Hungarian roller mill" to Germany. Moreover he builds complete grinding plants.

During the first decades, the focus of Gebr. Pfeiffer lies on steam engines which are very much in demand: in fact they are used to drive weaving looms and handling equipment for deep coal deposits in coal mines, they facilitate iron production in blast furnaces and drive railway locomotives and ships.

"Ease of access and precise construction" - this is what Pfeiffer's steam engines become known for in Europe

Since the 1880s, steam engines are becoming more and more versatile reflecting the technical development and adapting to ever increasing requirements of the industries. In fact the range of Gebr. Pfeiffer comprises small engines from one to four hp required by craftsmen like instrument makers, for example, as well as machines with a maximum power of 1,000 hp for the industries.

In 1872, at the third Palatine industrial fair, "Gebrüder Pfeiffer Maschinen-Fabrik und Eisen-Gießerei" (machine building factory and iron foundry) is awarded the first prize, the gold medal. The catalog refers to the "horizontal steam engine with condensation" which is characterized by its low consumption of coal along with a simple design "for ease of access to all parts and with a solid and precise construction. Only the best materials are used for manufacture and all essential parts are made of cast steel or bronze." These are the standards for production and quality which are still employed today on all machines from Gebr. Pfeiffer, standards appreciated by customers at the time and nowadays alike. From a Kaiserslautern based stoneware factory, Gebr. Pfeiffer receives a letter saying: "It is a great pleasure to confirm that the high pressure steam engine supplied by you functions to our full satisfaction. We also wish to emphasize that the machine distinguishes itself by a very regular and smooth run and a solid construction." In 1871 Gebr. Pfeiffer





Since the 1880s, Gebr. Pfeiffer has decorated its business letters with the successes achieved in its young company history: medals and awards received at various trade fairs.

succeeds in establishing a most important business relationship: the renowned company Villeroy & Boch buys from Pfeiffer an essential part of the manufacturing equipment for the industrial production of structural ceramics and sanitary ware as well as tableware and tiles. Hence it is not a coincidence that the oldest letter of recommendation written in July 1880 is received from Villeroy & Boch who are very much impressed not only by the iron water wheel and gear rim with a height of 6.5 meters and a width of 4 meters: "Solidly built, all of the machines distinguish themselves by functioning properly with their smooth and reliable operation."

Ten years later, Karl and Jacob Pfeiffer can already strike a positive balance: frequently awarded gold and silver medals at important fairs, their products achieve good sales figures. The number of employees has already increased to 128. Meanwhile, Gebr. Pfeiffer can sell its steam engines to the Saargebiet (later renamed Saarland), to Northern Germany and Saxony, to Luxembourg, Hungary, and Russia.

1 In a newspaper advertisement dated 1867, Gebr. Pfeiffer recommends itself "for the construction of any articles coming in the field of machine building".

2 Jacob Pfeiffer, photo taken in 1872. The young factory owner enhances the company's specializing in preparation technology and lays the foundation for today's competence center in Kaiserslautern.

3 The oldest invoice preserved was issued by Gebr. Pfeiffer in 1865.

**Die
Maschinen-Fabrik
von
Gebr. Pfeiffer in Kaiserslautern
(Rheinpfalz)**

empfehl^t sich im Erbauen aller in das Maschinenfach einschlagender Artikel, als: Dampfmaschinen jeglicher Art und Größe, stehende Locomobilen, Wasserräder, Mahl-, Oel- und Schneidmühlen, Feuersprizen, Pumpen jeder Art, Pressen, Bierbrauereieinrichtungen für Hand- und Maschinenbetrieb, Transmissionen, Papierholländer, Schrotmühlen, Schubleisten- und Schneidmaschinen, Gebirgsbrechmaschinen zc. zc. unter Zusicherung billiger und prompter Bedienung bei solidester Arbeit.



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3

Kaiserslautern, den 30 Junij 1865

RECHNUNG

für *Jahre* 1865 *an* die *Ordn.* hier

**von
Gebrüder Pfeiffer.**

Bei Remessen auf nicht Wechselplatz übernehmen wir keine Verpflichtung rechtzeitiger Präsentation noch Bei-
bringung eines Protokolls und behalten uns vor etwaige Zwangsloskosten darauf später in Anrechnung zu bringen.

Lith. v. Hambrun in K. Lautern. Zahlbar hier, Ziel 3 Monate oder pr. Compt. mit Senko

<i>Remission gegen auf Ihre Ordre Kaufung von Gofu</i>			
<i>May</i>	<i>19</i>	<i>1 Abz. Remission</i>	<i>7 320 7/8 22.24</i>

CHAPTER 2

GROWTH DURING THE GERMAN EMPIRE - FROM KAISERSLAUTERN INTO THE WIDE WORLD 1880-1918

In 1885, Jacob Pfeiffer undertakes a far-reaching endeavor by placing onto the markets of continental Europe the so-called wind separator - hence the modern separator - which still is a central element of each mill today. By constantly improving this technology, the company soon has a clear lead over its competitors.

In 1892, Pfeiffer publishes its first detailed catalog of "machines for hard comminution", the special field Gebr. Pfeiffer will soon be focusing on. Another technological milestone is the Pfeiffer hard ball mill first built in 1904 with a double separator in a continuously operating grinding unit. At the beginning of the 20th century, Gebr. Pfeiffer has customers all over the world. This boom was, however, stopped by the First World War.



Successful preparation technology

Of course the Pfeiffer steam engines and first mills contribute to the company's remarkable boom, however, another feature is most important in this context: the preparation technology. At a very early stage, Pfeiffer is granted patents for machines designed by the company, publishing in specialized magazines as a designer and manufacturer of grinding mills, oil mills, cutting mills, and grain mills which are used in the ceramic and iron industries above all.

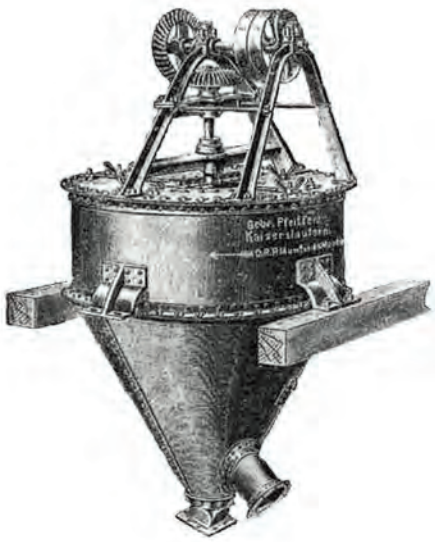
For example, an exhibition catalog cites Gebr. Pfeiffer as a company always striving to maintain the confidence of its customers by supplying solidly built equipment: "With our new and practical machinery we are in a position to comply with any requirements and guarantee that our machines are of high quality in terms of their solid construction and production rate."

Actually the customers do not hesitate to confirm their full satisfaction with all machines supplied by Pfeiffer: edge runner mills, crushing mills, grinding equipment, clay kneaders, presses or the like, for the preparation of soft and medium hard materials of the ceramic and clay industries.

Slag grinding

From the 1880s, a new process has been used in Germany for the manufacture of steel, the so-called Thomas-Gilchrist process named after the British metallurgist Sidney Gilchrist Thomas. This process is most suitable for the preparation of high-phosphorus iron where "Thomas slag" is obtained. This slag is finely ground and sold as Thomas meal which is a phosphate fertilizer mainly used in agriculture.

The Thomas-Gilchrist process opens up new options for Gebr. Pfeiffer. In fact Jacob Pfeiffer is the first manufacturer to introduce Thomas slag preparation in Germany by grinding Thomas slag, a foundry by-product, in grinding plants which become a top seller just like the machines for cement factories. Moreover, Gebr. Pfeiffer starts manufacturing complete slag cement and Portland cement factories with modern rotary kilns. Gebr. Pfeiffer also manufactures grinding equipment to be used in grain mills and the ceramic industry.



Further developed by Gebr. Pfeiffer with a focus on the requirements of cement producers, the wind separator becomes ready for the market very soon. The entire comminution industry breaks new ground with the use of the wind separator, not only in Germany but soon worldwide.

Jacob Pfeiffer carries out experiments with lime and sand with a view to hardening these under pressure. The results help enhance the sand lime bricks industry and also enlarge the range of products of Gebr. Pfeiffer. From the 1880s, the company has also been designing mills for medium hard and hard materials.

Worldwide success with wind separators and wind selectors

Well into the 1880s, the nonmetallic minerals industries have only got primitive sieves made of wire mesh or tissue for separating coarse from fine material. In fact they are in urgent need of a machine suited to produce a very fine product. In England, engineers are developing a method of separation using wind: with a circulating air flow the ground material can be separated much better than without it. This is actually the birth of the so-called "wind separator".

Recognizing the advantages of this machine, Jacob Pfeiffer acquires an English patent for a wind separator in 1885 laying a new foundation for his company. To be noted that technically seen wind separators are new grounds at the time. Today they are indispensable in modern preparation technology. In their newest versions, the separators are still part of the Pfeiffer production range.

In the years to come Gebr. Pfeiffer is perfecting the design and construction of the wind separators, thus gaining an everlasting leading position among the world's separator manufacturers. Between 1888 and 1892, a total of 387 wind separators are manufactured to the full satisfaction of the entire comminution industry both in Germany and any other industrial countries of the world, for example in the United States and the Far East.

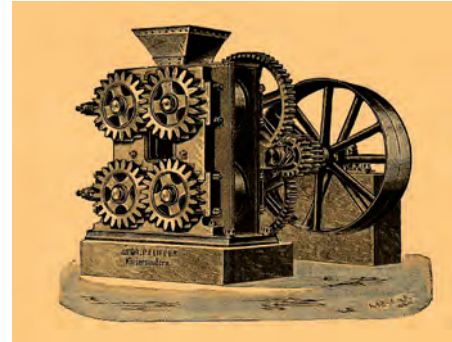
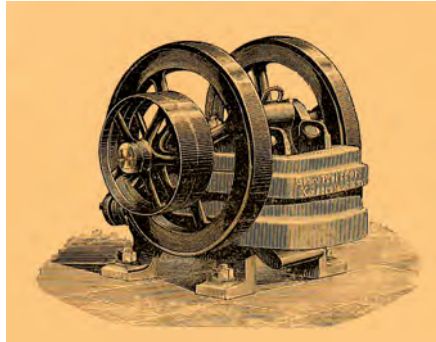
The efficient wind separator is rapidly becoming an integral part of preparation plants in the ceramic and cement industries. Other industries, too, recognize the advantages of this machine for the production of high-grade fine products. Especially the dye-making industry needs a ground product with a very high fineness degree for its products. This requirement is fulfilled by a new machine built by Gebr. Pfeiffer and placed on the market in 1910: it is the Pfeiffer selector starting its triumphal course through the world.



In 1885, the English engineer Robert Moodie (left) invents the centrifugal wind separator which is, however, still in its infancy. Recognizing the significance of the principle, Jacob Pfeiffer obtains the license for Moodie's patents. In 1908, Moodie visits the company of his business friend in Kaiserslautern. The newspaper of the clay industry writes the following comment at the time: "We thought we should present to our readers this nice picture, quite obviously an embodiment of the interconnection of theory and practice, inventive genius and entrepreneurial spirit which perfectly complement each other."

1 Around the turn of the century, stone crushers made by Gebr. Pfeiffer are used to comminute cement clinker, basalt, quartz, ore, and other materials as well as for the production of gravel for road construction.

2 Rolling mills are used to produce a coarse meal. Around 1900, Gebr. Pfeiffer offers various designs of double rolling mills, the biggest one achieving 150 revolutions per minute, with a 12 hp drive and a weight of 12.5 tons.



With this innovative machine, powder with an extreme fineness can be produced. Used in the cement industry, for example, the wind selector helps produce a particularly high-grade, pressure-resistant cement. Until 1914, about 1,800 wind selectors are manufactured by Gebr. Pfeiffer, working very successfully in Germany and abroad in the most various sectors, e.g. cement, lime, gypsum, fertilizer, porcelain, ceramics and brick industries including pulverized coal firing. In the 1920s, the wind selectors are also used in coal mines.

Specialist for hard comminution

Building factories, tenements, military barracks, town halls, streets, railway lines, channels all over the country, the ambitious German Empire requires large amounts of cement. The first detailed company catalog dated 1892 documents the company's specializing in machines for hard comminution and plants for the lime, gypsum, cement, and ceramics industries. The catalog includes machines for pre-crushing, for the production of coarse meal and fine meal, for kneading, mixing, and shaping, for separating, sieving, and grading as well as ancillaries for the comminution plants and dryers. Gebr. Pfeiffer is not only dealing with the supply of individual machines and setting up complete plants for hard comminution but also with the rebuild of factories which are not equipped as best as possible.

In the following years, various developments made at the Pfeiffer works contribute to make Pfeiffer known all over the world as specialized company. Milestones on the company's way to international renown are the Pfeiffer screenless ball mill combined for the first time in 1904 with the patented double separator to form a continuously working grinding unit and also the screen ball mill. Quite a special innovation is the double hard ball mill. Here again, to suit the requirements of the customers, Gebr. Pfeiffer initiates another technical development: the customers wish to produce fine products with an upper grain size between 0.2 and a maximum 1.0 mm. The Pfeiffer engineers are working on this problem for three years, with much success: in 1912, they can place the patented double hard ball mill on the market.

This mill type must indeed be considered revolutionary in grinding technology. With its two material inlets, its capacity and variety of applications,



In its 60-page catalog dated 1892, Gebr. Pfeiffer presents machines and plants for hard comminution.

1 The company's premises being situated next to the railway line is a strong locational advantage, from the very beginning of business, for transporting the heavy machines from the factory to the destination. Photo taken around 1910.

2 Where there is no railway line or water way, horse power is needed for transportation: the long tube of a rotary kiln on its way to a Russian customer in 1912.



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Gebr. Pfeiffer in Kaiserslautern on the eve of the First World War. Mainly wind separators, machines for hard comminution and double hard ball mills are supplied to customers all over the world. However, export business is stopped abruptly by the war and part of the production facilities must be used for the manufacture of ammunition.

this ball mill is sort of a multi-purpose mill, the first to be placed on the market. It can be used to grind any material whatsoever, with various hardness degrees, producing the entire range of fineness, from coarsest to finest. As early as in the first production year, Gebr. Pfeiffer is awarded contracts for 60 double hard ball mills supplied in most cases together with a wind separator.

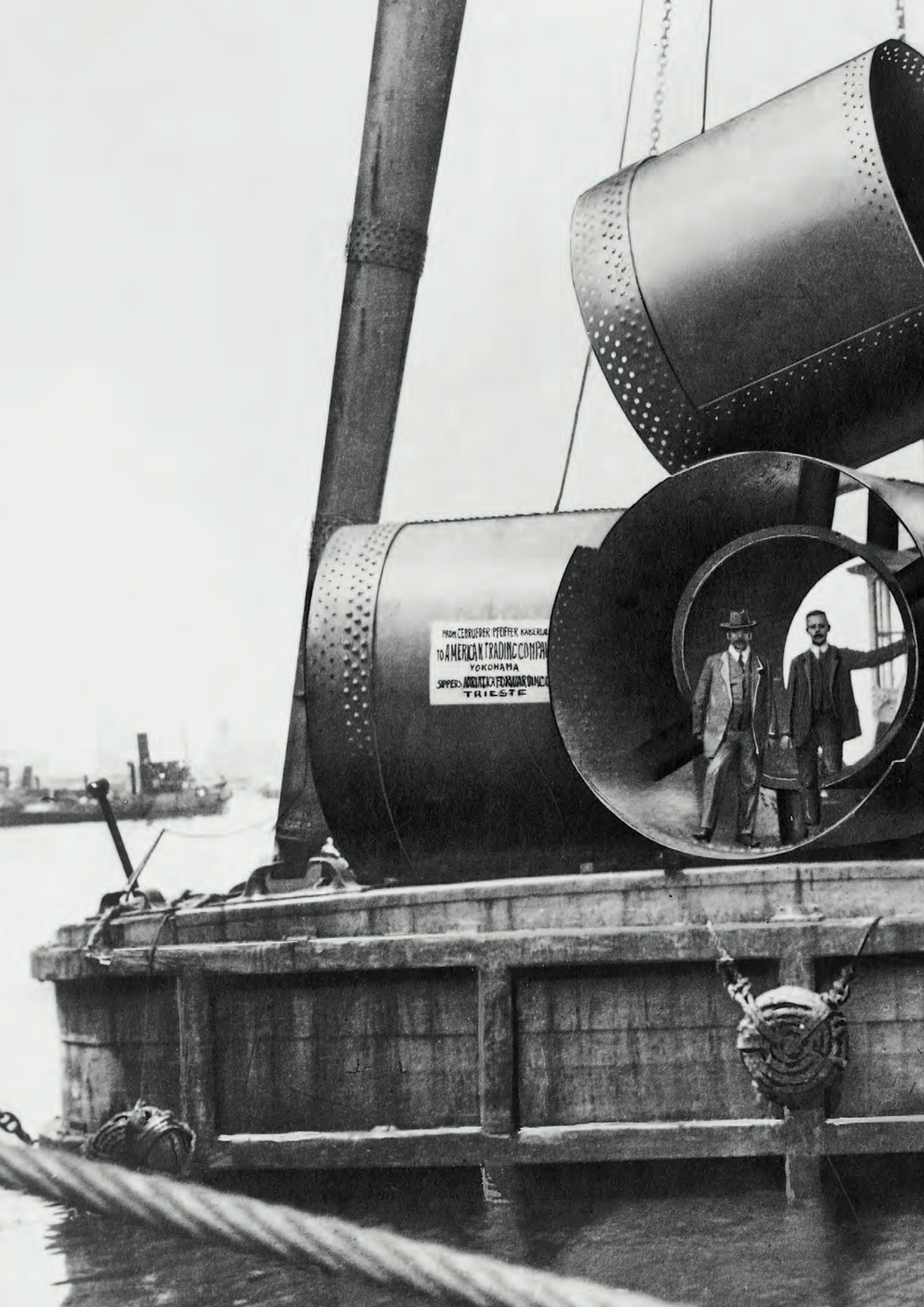
Growth in every sector

By enlarging the sector of machines for hard comminution, the production range of Gebr. Pfeiffer is more versatile than ever before, including its own designs of hammer mills, impact ring mills, as well as pre-crushing equipment like jaw crushers and various roller crushers. Pfeiffer also offers special machines for different sectors like clay cleaners, clay cutters, brick presses, press pumps and slab presses for the ceramic and porcelain industries. At the beginning of the 20th century, Gebr. Pfeiffer starts building horizontal rotary kilns and vertical shaft kilns. As the customers prefer having the complete preparation plants planned and set up by one contractor, Pfeiffer decides to also manufacture feeding devices, handling equipment, and bagging machines.

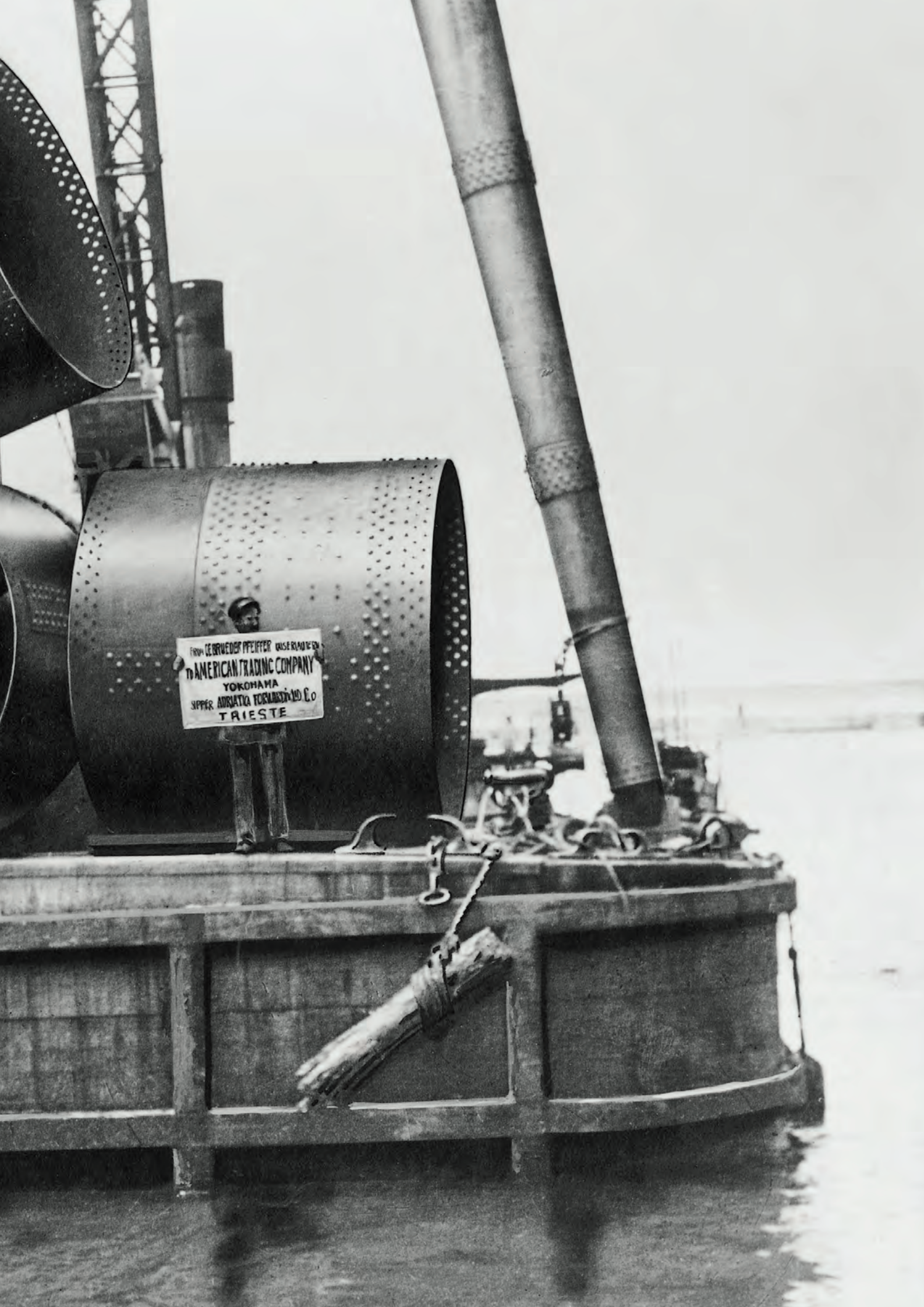
Pfeiffer's specializing in wind separators and machines for hard comminution results from the knowledge that a company must always adapt to changing market conditions to be successful. Hence Gebr. Pfeiffer is ready to seize new chances. The company continues keeping the design of the steam engines to state-of-the-art standards but after the turn of the century, the demand for steam engines declines because they are increasingly often replaced by more flexible energy generators like Diesel or electric motors. With a total of 837 steam engines supplied, Gebr. Pfeiffer finally gives up this sector around 1912.

Gebr. Pfeiffer has become one of the leading companies supplying complete machinery equipment for modern hard comminution of any type of material. The capacities of the existing machine building factory in Kaiserslautern are not at all sufficient any longer. Therefore, in 1896, the foundry is modernized, a factory hall is set up and a crane is installed. Two years later, a boiler and engine house is constructed.

In 1899, when brother Karl leaves the company, Jacob Pfeiffer becomes sole owner. In 1900 he acquires the fertilizer factory adjacent to his premises.



FROM CEORUJEDER PFEDFER KASERLICH
TO AMERICAN TRADING COMPANY
YOKOHAMA
SHIPPER: AUSTRIACA FORWARDING CO.
TRIESTE



VON GEORGE PEIFFER WAREHÄUSER
ZU AMERICAN TRADING COMPANY
YOKOHAMA
SHIPPER ADRIATICA FORWARDING CO
TRIESTE

"Paris, 29, rue de Paradis": adapting to the growing export business, Gebr. Pfeiffer sets up various representations abroad. Letterhead dated 1907.



In 1909 the director's villa with a large park is constructed. In addition the director has more workshops and a test station set up. In fact these big laboratories with their modern equipment should become very important for Gebr. Pfeiffer because they have been used ever since to develop and test, in close cooperation with its customers, innovative products to be used in the sector of hard comminution.

The company is no longer situated on the outskirts of Kaiserslautern as it was at the time of its foundation. Around 1908 the town is more and more approaching the works premises, finally enclosing it while growing bigger during the years to come.

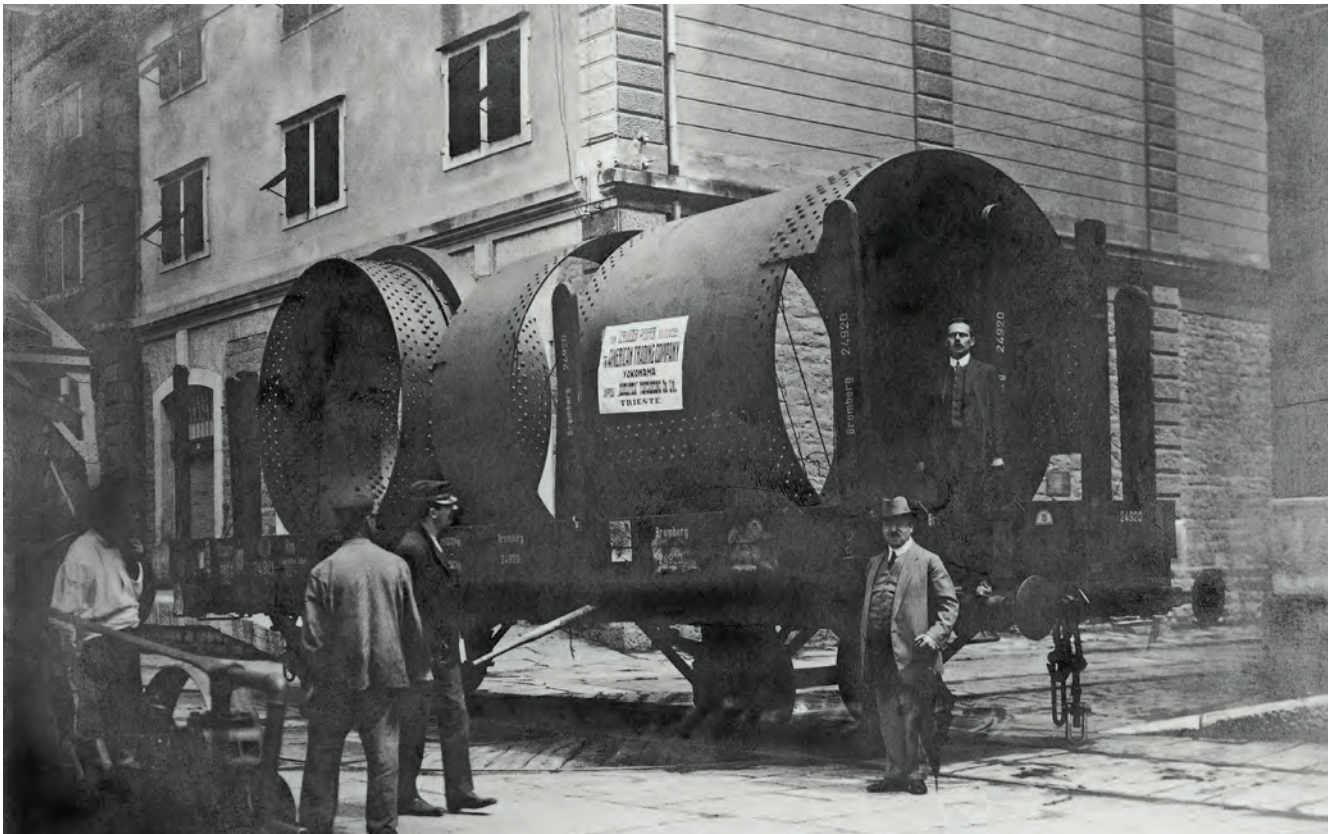
Previous page: From Kaiserslautern via the upper Adriatic Sea to Tokyo Bay: in 1913 machine parts from Gebr. Pfeiffer for a Japanese cement works are loaded on a cargo ship in Trieste.

Customers all over the world

In 1912 Gebr. Pfeiffer supplies a double hard ball mill with two rotary kilns to a Russian firm. In a letter dated January 2, 1914, the customer Aktiengesellschaft der Vereinigten Portland-Cementfabriken Sheljeso-Cement expresses his "deep satisfaction", wear being in fact negligible: "In view of the outstanding results, we decided to order four more grinding units for cement and coal for our Wolsker works which has been operating for some length of time. In addition, we have passed an order for three grinding units 08 and a wet mill 08 to be set up in our Saint Petersburg works."

What is most important to the business partners is not only the proper functioning of the machines but also their contribution to improving efficiency of operation and thus increasing the financial results. So in January 1914, for example, the German firm Anneliese Portland-Cement- und Wasserkalkwerke AG located in Westphalia reports on its experience with the rotary kilns, grinding machines, steam engines, handling equipment and ancillaries bought five years earlier. The firm states that by installing another drying drum and a double hard ball mill the capacity of the factory has been increased by about 50 per cent and the fine cement produced with the wind selector is "of outstanding quality" meaning the firm is entirely satisfied with the equipment supplied by Gebr. Pfeiffer. In fact the firm would "highly recommend" Gebr. Pfeiffer anytime.

From Mexico a letter of appreciation written by another satisfied customer is received. The director of the dye-making factory "Manufactura de



Prior to the First World War, Gebr. Pfeiffer delivers to all industrial countries, also aiming at foreign patents. For example, Jacob Pfeiffer writes to the American patent office around the turn of the century: "Be it known that I, Jacob Pfeiffer, a subject of the King of Bavaria, residing at Kaiserslautern, in the Kingdom of Bavaria, German Empire, have invented certain new and useful Improvements in Sorting Devices ..."



Jacob Pfeiffer's villa built in 1909 where he resides with his family. Today the offices of the executive board members are to be found here as well as a training center.

Pinturas de Trinidad S.A." writes on November 12, 1912: "... that the grinding unit with selector supplied to us meets our requirements as far as fineness and grinding capacity are concerned what we do not wish to fail to confirm to anyone interested in your machinery".

The correspondence of Gebr. Pfeiffer with its customers on the eve of the First World War reflects the various applications of the machines made in Kaiserslautern. In January 1913, for example, reference is made by the Kaiserliche Kanalamt (imperial water supply) of Kiel/Northern Germany to the grinding units for trass needed for the construction of the new Baltic Sea locks, stating that the grinding units "perform impeccably". Grinding coke, coal, and dried raw clay for a foundry, the Deutsch-Luxemburgische Bergwerks- und Hütten-Aktiengesellschaft (mining and metallurgical company in Germany and Luxembourg) praises the grinding equipment from Gebr. Pfeiffer "because it entirely fulfills our requirements as well as the performance promised by you." Other letters arrive from French machine building companies, cement works in Japan, ceramic factories, candy factories... Pfeiffer's production portfolio attracts customers from all over the world and in a wide range of industries.

This success is mainly due to Jacob Pfeiffer's son Oskar who joins the family company in 1909, concentrating on the development of markets abroad. From his business trips to America, Northern Europe, Japan, and China, he sends regular letters back home. In the United States, he negotiates with customers, gets to know the most recent American technical developments, seeks out persons or firms to function as a representation of Gebr. Pfeiffer, presents the Pfeiffer machinery at conferences and in the press, and also negotiates on licenses. When visiting Vulcan Iron Works, he encounters his own family history: the secretary's grandfather was a former apprentice in the factory of Jacob Pfeiffer Sr.

An industrial pioneer from Kaiserslautern: "Jacob of the Palatinate"

This is how he is called already in his lifetime. Jacob Pfeiffer (1842 - 1919) is a striking entrepreneurial personality of the 19th century. As a founder, factory owner, and pioneer of industrialization, he lives by the motto: "Resting is rusting." There are lots of anecdotes describing him as a severe but caring patriarch. For example, when one of his workers was sick, he took his coach to look in on him himself and bring him a basket full of food.

Jacob is the fifth of nine children born to Jacob Pfeiffer Sr. He grows up in Klostergasse in the old part of Kaiserslautern, moving to Fröbelstraße later on. His father would want him to become a merchant but young Jacob has a passion for engineering. Hence he is allowed to become an apprentice at his father's factory for three years, acquiring profound knowledge, both practical and theoretical, in the art of engineering. For the theoretical skills, he joins the Kaiserslautern based agricultural and vocational school where he is instructed in mathematics, mechanics, and construction. After his apprenticeship, he works as a fitter and also as an engineer in various machine building factories. In 1860, he becomes a student at the technical university of Karlsruhe.

Under the direction of Jacob Pfeiffer, the company develops into a leading enterprise in the field of hard comminution. As a member of the Association of German Engineers (VDI), he is elected several times to head a subgroup of this association in the Palatinate/Saargebiet named Pfalz-Saarbrücker Bezirksverein whose honorary member he would become later on. In these functions he represents the interests of the association and of German engineers. Jacob Pfeiffer is awarded the title "Kommerzienrat" by the government honoring him as an important personality in the country's economy.

In 1918, Jacob Pfeiffer retires from active business and moves to his retirement home. The founder of Gebr. Pfeiffer dies at age 78 on October 27, 1919.



1914 - a culmination point in the company's development

Gebr. Pfeiffer's steep rise takes place between 1864 and 1914, interrupted only by a few economic crises, and reaches its peak in the year 1914. 50 years after its foundation, Gebr. Pfeiffer has subsidiaries in Paris and Saint Petersburg and employs 500 workers and employees in its Kaiserslautern works. 57 out of these 500 have been working for the company for more than ten years, 15 for more than 25 years. The company's sales figures amount to three million marks, with an export portion of 75 per cent, mainly to Russia, France, Belgium, and Japan. To be noted that exports should remain the company's main business and key to success for the next 100 years to come.

Rising from humble beginnings, the founders and particularly Kommerzienrat Jacob Pfeiffer have developed the firm inherited from their father into an expanding company which in the early 20th century is known worldwide. Also as far as workers' and employees' benefits are concerned, Gebr. Pfeiffer is a model company: a pension fund created in the year 1900 supports workers older than 65 or after having worked for a minimum 40 years or in case of disability. The pension fund also supports the workers' widows and children. The funds are raised by contributions of the workers and the company along with nonrecurring seed money paid by the company. Workers and employees are granted a six-day paid leave per year. Gebr. Pfeiffer trains its apprentices and offers drawing courses in the factory.

However, this constant rise is stopped abruptly on August 2, 1914, with the outbreak of the First World War, "the primordial catastrophe" of the 20th century. As is the case with most German companies, times become difficult for Gebr. Pfeiffer. By order of the Emperor, part of the production facilities must be used for the manufacture of wartime goods. The work in the factory suffers from lack of personnel and raw material. Foreign markets collapse. Except for a few military supplies to Austria, exports are at standstill.

Chapter 3

TECHNICAL INNOVATIONS - A MEANS AGAINST CRISES 1918-1948

Life after the First World War is characterized by poverty, political unrest, and most of all by inflation. In 1918 Oskar Pfeiffer takes over as head of the company and succeeds in reestablishing the export business brought down by the war. But he dies unexpectedly in 1925. In the years to come Gebr. Pfeiffer has to cope with serious challenges.

Thanks to a great number of big orders mainly from Russia, the company survives the world economic crisis around 1930. The company regains momentum in the 1930s with new products like rotary kilns for the aluminum industry. Although the company's facilities are destroyed almost completely during the Second World War, the company is able to restart as early as 1946.



Oskar Pfeiffer - successful crisis manager

Oskar Pfeiffer (1876-1925) takes over in 1918 after his father's retirement from the management. Jacob Pfeiffer dies only shortly later. When the company is transformed from a general partnership into a stock company on December 19, 1921, Oskar Pfeiffer is appointed sole director of the company. The graduate engineer is supposed to lead the company through difficult times.

After the First World War, the provinces Alsace and Lorraine annexed by Germany in 1871 rejoin France, with the Palatinate becoming a border region. In January 1919 the Allies' troops occupy the regions on the left bank of the Rhine, with Kaiserslautern being part of that region. France's intention is to be safe from being attacked again by Germany and to receive war reparations from Germany. The occupation of the Rhineland, the separation of the Saargebiet from the German Reich as well as the exit of Luxembourg from the Deutsche Zollverein (German Customs Union) are intended to hit the machine building industry hard. As a result important markets are being lost.

Gebr. Pfeiffer's fabrication has to cope at times with the lack of raw materials like raw iron and coke. Nonetheless the company is capable of modernizing its facilities and developing new machinery for hard comminution as well as new air separators. Thanks to its innovations, demand for Pfeiffer machines gets stronger again as early as 1921. Ranging among the customers are the most important coal mining companies in the Ruhr region and in Upper and Lower Silesia. Oskar Pfeiffer succeeds in acquiring big orders from abroad as well, with air separators required by customers in Belgium and France for the coal mining industry.

Most of all, business with the Soviet Union contributes to the good order intake. In fact the huge country enhances industrialization in the 1920s, especially in the construction of heavy machinery, steel production, and energy supply. For this purpose, the Soviet Union urgently requires support from abroad. From the coming into force of a German-Russian trade agreement in April 1921, business relationships are constantly extended, with the Soviet government placing many orders with German companies. One of them is Gebr. Pfeiffer. Between 1921 and 1933, almost 40 grinding groups comprising double hard ball mills and air separators as well as large-size mills are delivered to Russian power stations, lime works and cement works.



1 Dividend warrant of Gebr. Pfeiffer. The company is transformed into a stock company in 1921.

2 Notgeld of Gebr. Pfeiffer, 1923. During inflation, such emergency money serving as vouchers is issued because a legal medium of exchange is not available in the amounts needed.

Orders are also received from the Soviet government for rotary kilns and shaft kilns for the cement industry as well as stone crushers for coal processing.

This positive development is, however, interrupted by the year of crisis 1923. In fact, in January, French and Belgian troops occupy the entire Ruhr region aiming at taking the coal and coke production in this region as "productive security" for the war reparations to be paid by Germany. For many months Gebr. Pfeiffer stays completely cut off from its customers and most importantly from raw material supplies. The company has indeed great difficulties in procuring raw materials and combustibles from abroad. Business trips are no longer possible and the company's dispatch department cannot work normally.



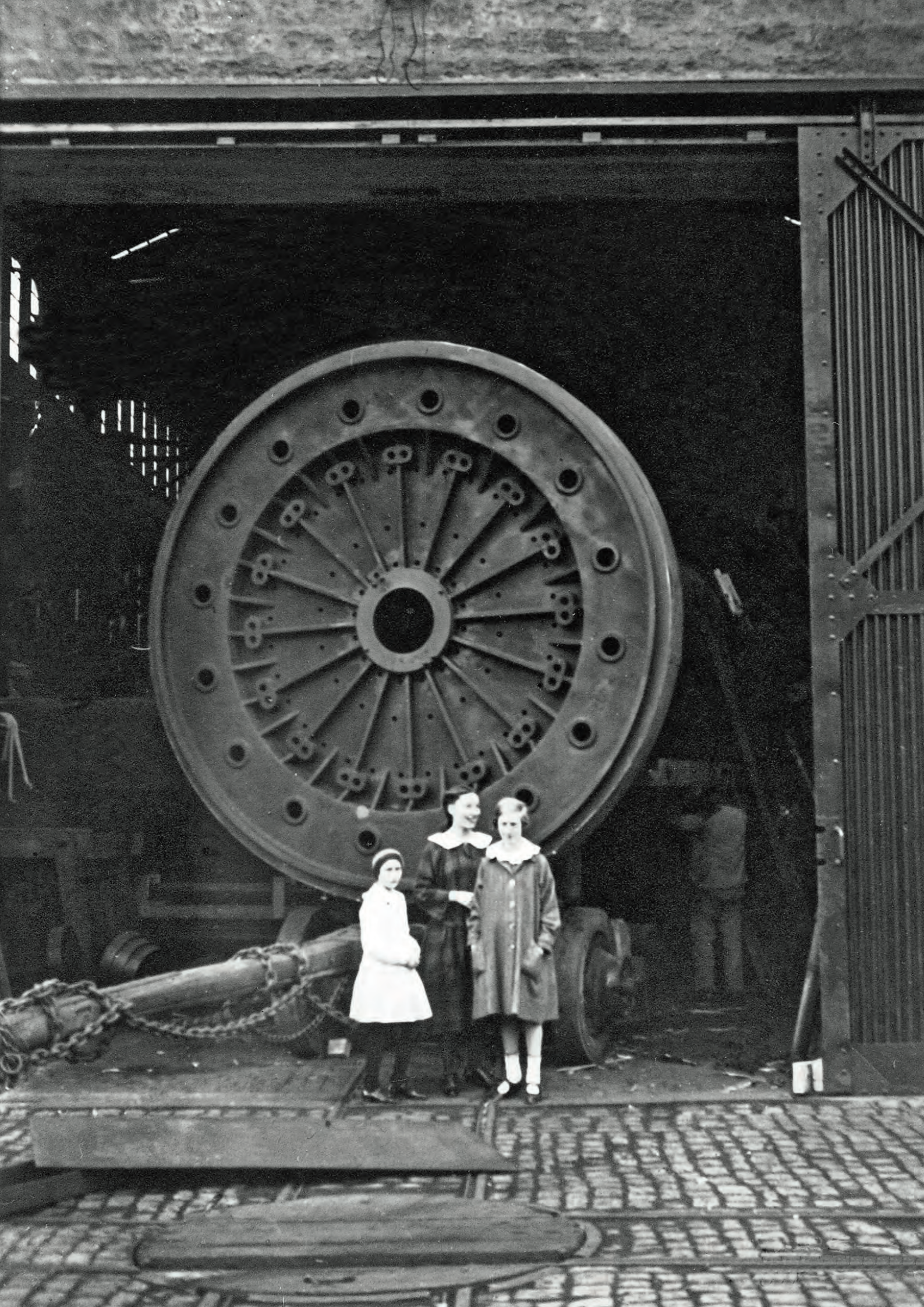
From 1909, Oskar Pfeiffer is opening up new markets abroad and is going to lead the family company through difficult times of heavy economic crises.

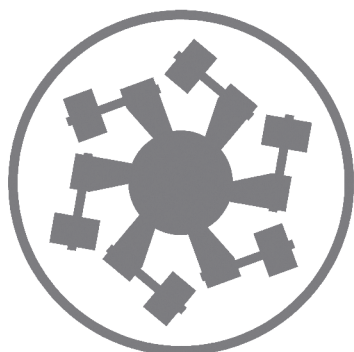
Next page: Jacob Pfeiffer's three granddaughters (f.l.t.r. Helene, Herta and Ida Luise Mehrens) on the works premises in front of a ball mill around 1920.

When the 60th company anniversary is bound to take place on February 25, 1924, no one is in the mood for celebrating: "In view of the seriousness of the situation, it was decided to refrain from any celebration whatsoever" (quotation from the financial report of 1923/24). It is now that Gebr. Pfeiffer, too, experiences the consequences of the inflation policy as a result of war, achieving its peak in 1923 with the hyperinflation and ending only with the introduction of the new Goldmark on January 1, 1924. The balance of 1923 shows the astronomic sum of 297,656,540,000,000,000 Marks which is almost 300 quadrillion Marks. What is left after the introduction of the new currency is a share capital amounting to 1.2 million Goldmarks and a balance sum of 1,560,716 Goldmarks. But thanks also to the lucrative business with the Soviet Union, Gebr. Pfeiffer's sales figures of 1925/26 are soon back on the prewar level.

This is indeed a success ensured also by Oskar Pfeiffer's activities as a crisis manager but unfortunately he does not live to see it, dying at age 49 on June 28, 1925. Since Oskar has no children, the company passes over to his sister Helene Mehrens and her children. Hence the company remains in the hands of the family even though its name is no longer Pfeiffer.

By his last will and testament, the entrepreneur has a supporting fund created for cases of hardship, with mainly older employees profiting from such fund which was increased by 25,000 Reichsmarks paid in by the Pfeiffer family. After the Second World War, the foundation shall be established anew, forming the financial basis of the future Oskar- und Helene-Pfeiffer-Stiftung GmbH - another success belonging to Oskar Pfeiffer's legacy.





The sign of quality and performance

Soon after the First World War, Gebr. Pfeiffer is given a new face: it is on Oskar Pfeiffer's initiative that a modern company logo is created referring to the comminution of materials with hammer mills, a Pfeiffer owned innovation used in former times mainly for grinding medium hard and viscous materials. Heated hammer mills are still in use today in a patented process when it comes to economically adapting gypsum as a sulfate carrier before it is fed into an unheated cement mill. However, hammer mills have long been out of the main focus of Gebr. Pfeiffer.

This former logo is still used today in a modernized version because it is a symbol for comminution technology and the company's hallmark standing for good quality and performance of its products.

Innovations for the building materials industry

In the second half of the 1920s, many companies aim at simplifying, standardizing, and rationalizing their production processes. In the cement industry, for example, the fine grinding of coal becomes ever more important because the finer and more homogeneous pulverized coal is, the easier it is to burn it without any residues, for optimum use of heat. Kiln operation will only be economic in terms of combustible consumption if the coal mill produces pulverized coal of utmost fineness and homogeneity. This is exactly what is ensured by the three-roller mill developed by Gebr. Pfeiffer.

The three-roller mill with the suffix D.R.P. meaning that it is protected by a German patent ("Deutsches Reichspatent") distinguishes itself by its high efficiency and simple design. In fact the mill needs only a minimum of wear parts and has no articulations, sliding guides or spiral springs. This ensures a "smooth, resilient operation that will quite inevitably enthuse the viewer" as is written in a leaflet at the time. Further advantages are to be found in the high grinding efficiency even with the hardest materials as well as the option of controlling grinding pressure during operation. "It can be seen at one glance that the mill's execution is based on practical experience and meant for everyday use. Its simple and clear construction as well as its reliability are unsurpassable."

Another technical development by Gebr. Pfeiffer provides a clear advantage over the competitors in these crisis-shaken times. Pfeiffer's double hard ball mills with high efficiency air separators for high fineness degrees have a decisive advantage over traditional processes: in a tube mill the material to be ground dwells in the grinding drum until it has achieved the envisaged fineness. In the double hard ball mill, the material rapidly passes through the mill and is then lifted up to a high-efficiency fine separator. The latter discharges the finished fine meal immediately whereas only the oversize material is returned into the mill for being reground, ensuring a reduction of mill load. The grinding balls have an increased efficiency as compared with long tube mills, compound mills or multi-chamber mills.

In advertising letters Gebr. Pfeiffer points out to its double hard ball mill "which is becoming more and more appreciated by the cement industry", stating that the customers are convinced "by the outstanding performance of our machines and the impeccable properties of the fine meal". According to Gebr. Pfeiffer, the double hard ball mill in combination with the



Simple idea, big impact: three-roller mill, a top seller of Gebr. Pfeiffer in the 1920s.



In 1925 the biggest cement mill in the world during this time leaving the company's premises - a challenge for the workers and exciting event for onlookers.
Double hard ball mills in a row in the assembly hall.

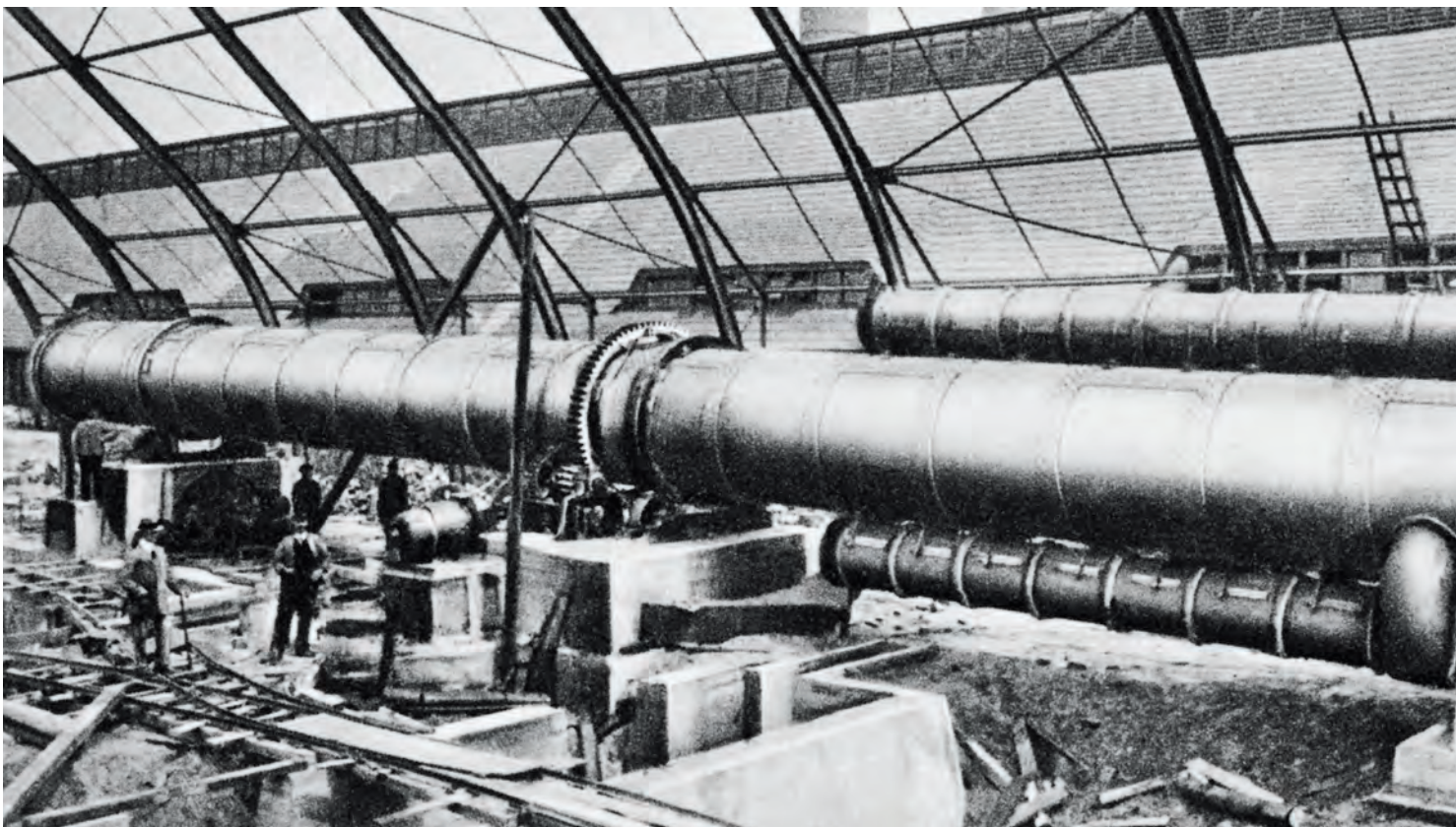
high-efficiency air separator is the best grinding group to be used especially for raw meal.

What is most important during these economically difficult times is to receive a positive feedback from customers. For example, the lime works "Kalkbrennerei Wilhelm Surmann" of Aschesloh/Westphalia explicitly thanks Gebr. Pfeiffer for the extension of the lime works. The plant supplied by Pfeiffer comprises a hammer mill for fertilizer lime as well as a screenless ball mill working in conjunction with a high-efficiency air separator for fine building lime. What impresses Surmann most is the economy of operation: "After having worked with the new plant uninterruptedly for more than a year now, I feel the need to express my appreciation of the plant both in terms of its general arrangement and its design, construction, and performance of every single machine. By connecting the plant to the suction bag filter also supplied by you, I have a practically dust-free operation."

Even more simplification and rationalization are reached by the innovative grinding-drying process developed in the 1930s. During this process, the raw material is dried while being ground. Screenless ball mills and double hard ball mills are particularly suited for combined grinding and drying which is confirmed by successful sales.

- 1 Excerpt from a post card album used by Gebr. Pfeiffer for advertising purposes in the 1920s.
- 2 Rotary kiln plant built by Gebr. Pfeiffer and installed at the works of a Russian customer in the 1920s.
- 3 Recuperator rotary kiln (D.R.P. patented) installed in a Silesian metallurgical plant in the 1920s.

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The Great Depression

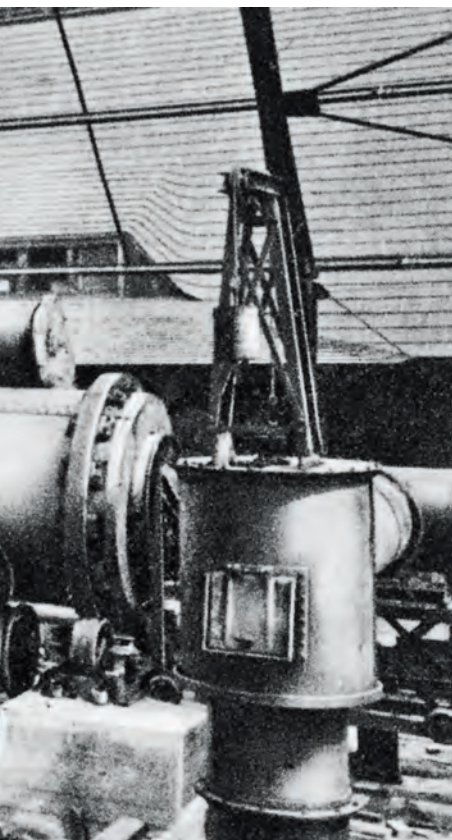
The name Golden Twenties refers to the period of 1924 to 1929 during the Weimar Republic where there is an economic boom followed by a severe crash, the Great Depression. This world economic crisis also adversely affects Gebr. Pfeiffer. Initially the company remains under full work load but by the end of the financial year 1930/31 inland sales figures have gone down by 25 per cent announcing seven lean years during which the company does not manage to get out of the red. In fact, in 1931, wages and salaries must be reduced and in 1932 Gebr. Pfeiffer has only 135 workers and 48 employees on its payroll.

The economic situation of the company continues to be strained when the National Socialist Party seizes power in January 1933. As the company is situated in the border region, hence close to France, it is not awarded any orders from the arms industry. When construction of the Reichsautobahn system begins, Gebr. Pfeiffer can supply machinery needed for roadworks. But the company will only be recovering from 1936 when it sets out to manufacture rotary kilns required by the aluminum industry for calcining clay. Gebr. Pfeiffer builds almost 50 plants with rotary kilns with a length of 50 to 100 meters. Thanks to the good order intake, a positive result is achieved again in 1937/38.

In fact turnover rises significantly and the company is in a position to finally tackle the modernization of the workshops which needs to be done urgently. Thanks to the positive business development, the company can increase the fringe benefits again. In 1938/39 a section in the factory is transformed into a gymnasium available to the employees. To be noted that this is the first and only company-owned gymnasium in Kaiserslautern. Gebr. Pfeiffer is also focusing on the formation of young employees by setting up another apprenticeship workshop, for sheet metal workers, in addition to the ones already existing.

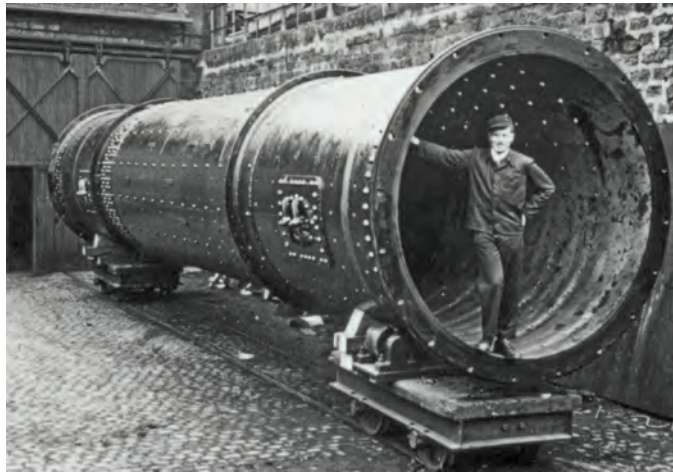
During the Second World War

The Second World War starts with the German invasion of Poland on September 1, 1939. Like in the First World War, Gebr. Pfeiffer again suffers from lack of raw material and personnel. At the beginning the company manages to continue manufacture as usual but is soon forced to change from peacetime to wartime goods.



1 Working conditions are slowly getting better again after 1945. Worker inside a ball mill around 1950.

2 Snapshot taken at the workshop during the Second World War.



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Although problems in material procurement become more and more severe during continuing war, Gebr. Pfeiffer can increase sales figures considerably and also strengthen its capacity by installing quite a number of new machine tools, with the focus in 1941/42 lying on the turning shop which must be adapted to increased manufacturing and sales. Even in 1943, works modernization is successfully continued. When local staff increasingly drop out, they are replaced by workers from abroad. In fact from 1942 to 1945, Gebr. Pfeiffer employs a total of 91 Russian prisoners of war who live in the company-owned barracks. The number of foreign personnel is increased in March 1943 by 23 civil workers of French origin who live in municipal barracks. To be noted in this context that in the year 2000 Gebr. Pfeiffer joins the foundation "Remembrance, responsibility and future" with the purpose of making financial compensation available to former forced laborers during the Nazi regime.

The Second World War develops more and more into a total war also affecting the civil population. On September 28, 1944, allied forces fly a heavy bombing raid over Kaiserslautern, also hitting the works of Gebr. Pfeiffer and completely destroying many facilities like the patternmaking shop, storage, electrical workshop, boiler house, and tool shop.

Severe damages are caused in the turning shop, foundry, fitters' shop, sheet metal workshop, and blacksmiths' shop, leaving only the office building, test station, garages, and some precious machines nearly undamaged. The authorized officer in the commercial sector, Rudolf Scheu who would be appointed member of the board later on, writes down as follows: "The bombing raid of September 28, 1944, hit a company which was well organized and equipped with most modern facilities, destroying almost 80 per cent of it."

Starting anew between shortage and talent for improvisation

On March 20, 1945, when the city of Kaiserslautern is seized by American troops, the war and the Nazi regime come to an end for the inhabitants. Important companies are occupied by the Americans. The buildings of Gebr. Pfeiffer or what is left of them is taken over by a combat unit to serve as military quarters. During its stay lasting for several weeks, Pfeiffer's employees



By the end of the summer of 1945, the company's reconstruction has progressed and work can be done on a small scale. From 1950 Gebr. Pfeiffer is regaining its former export strength. Snapshot of knocking-off time around 1950.

are not allowed to enter the premises. After the withdrawal of the Americans from the region, French troops move in. Unlike the American allies, the French claim reparations to be paid for damages caused by German troops during the war. Gebr. Pfeiffer is not spared in this at all. 14 modern machine tools that were not damaged during the war are confiscated, disassembled, and transported to France, with only the foundations being left in the factory.

The allied forces divide Germany into four occupation zones strictly separated from each other by borders. Kaiserslautern lies in the French zone. To be able to deliver goods to customers in the other zones or outside Germany, Gebr. Pfeiffer is obliged to observe highly bureaucratic rules imposed by military authorities. For each and every bevel pinion or ball bearing, permits must be applied for. Way bills, quota limitations, company checks by the occupying force and the like characterize the everyday work of Gebr. Pfeiffer during the years after the war.

In the meantime, most of the company's employees have returned either from military hospitals, prison camps or evacuation. Together with the remaining staff they go about reconstructing the company which by the end of the summer of 1945 has progressed to such an extent that work can be resumed on a small scale at least. For example, due to lack of gasoline, generators for wood combustion are built for trucks. When the situation slightly normalizes, 230 employees are back working on the standard production program as was usual before the war, manufacturing Molekulator mills (impact ring mills) and grain mills for agriculture from the year 1946.

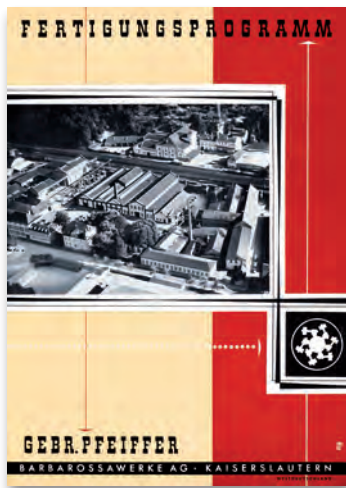
What is in fact needed is the talent for improvisation. During the "hunger year" 1947, the employees manufacture small mills for grain grinding that can be exchanged against bread, meal, and potatoes with local farmers. Moreover tile presses as well as jaw crushers and roller crushers are built which are used for rubble preparation. And last but not least, there is a huge demand by customers for spare parts. In 1947/48, despite severe supervision and limitations imposed by the allied forces, Gebr. Pfeiffer can sell individual machines to Switzerland, France, and Austria along with a complete plant to Turkey. As the authorized commercial officer puts it in 1948: "The work of the purchase department nowadays is restricted to a very large extent by quota limitations and lack of goods. However, this will be of a temporary nature only." He is going to be proved correct. From 1950, Gebr. Pfeiffer is gradually regaining its former export strength, achieving worldwide success with innovative products.

Chapter 4

WORLDWIDE SUCCESS WITH MPS VERTICAL ROLLER MILLS 1948-1978

In the 1950s, Gebr. Pfeiffer can take up the success achieved before the war by developing technical innovations like large-size calcining kettles for gypsum, three-stage slaking machines for lime or three-tube dryers.

In 1960 the MPS vertical roller mill sets out to conquer the international cement industry. During the following two decades, the mills are becoming ever bigger and more efficient. Gebr. Pfeiffer soon succeeds in selling complete grinding plants for cement works to customers all over the world. In order to stay competitive, the company invests in its machinery and buildings in the 1970s and opens up further markets abroad. By the end of the decade, Gebr. Pfeiffer has gained a leading position in the world market.

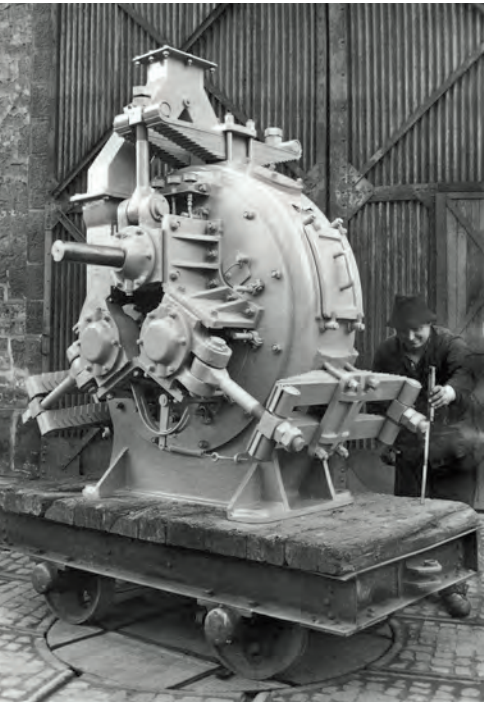


Return on the world market

Thanks to the currency reform of June 1948 with the introduction of the Deutsche Mark, the finances of Gebr. Pfeiffer are put onto a solid foundation. The economy of the Federal Republic of Germany returns to the world market and Gebr. Pfeiffer is awarded the first big contract from abroad in the order of about three million DM: in addition to an earlier order, the Yugoslavian government buys two rotary kiln plants, each 100 meters in length, plus two rotary kiln plants of 55 meters each for the calcination of clay in an aluminum works. The entire equipment weighs about one thousand tons loaded onto 40 railroad wagons - an incredible volume at the time. This big order helps accelerate the company's new start. Three years later, when all of the wartime damages are repaired, Gebr. Pfeiffer has regained the production capacity as available before the war.

Within few years, the company succeeds in revitalizing relationships with customers abroad and establishing new ties. Representations are to be found all over Western Europe. During their frequent business trips, the company's executive board members, engineers and foreign representatives maintain contacts and create new ones, succeeding in adding new customers to the portfolio. As early as 1950, Gebr. Pfeiffer can again supply its products to Italy and Austria, to Switzerland, the Netherlands, Belgium, Norway, and Ireland. With a European internal market being still far off, exports to neighboring countries are subjected to lots of different regulations to be followed for customs clearance and import of goods, sometimes even involving police activities. After the Second World War, there is a rising demand for quartz in Europe needed above all for the production of glass. Ranging at the time among the most important suppliers of grinding, separating, and drying plants for quartz, Gebr. Pfeiffer manufactures quite a special quartz grinding plant for a Belgian customer in the 1960s. The plant comprises a ball mill, two air separators, and the required handling equipment. The core of the plant is a special ball mill with a diameter of 3.4 meters, a length of 12 meters and a weight of about 100 tons. This is not only the biggest quartz mill built by Pfeiffer until then but also the biggest to be set up in Europe. Because of its size, it cannot be transported by railway but has to be loaded onto flat-bed trailers for road transportation. As the huge quartz mill exceeds any normal loading dimensions, police vehicles accompany the trucks, ensuring that the precious freight arrives safely at the destination.

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1 Taking final measurements for the camera: three-roller mill of Gebr. Pfeiffer in 1958.

2 Air separator of Gebr. Pfeiffer for a steel works in North Rhine-Westphalia in the 1950s.



Despite the growing East-West conflict, pre-war time relations with the countries of the Balkans are reviving. In the following years, Gebr. Pfeiffer succeeds in strengthening its market position in overseas countries as well, like for example, by means of representations in Africa, South America, and Asia.

Milestone MPS mills

Technical development is not at standstill either. In fact, after the Second World War, Gebr. Pfeiffer is aiming at conceiving a grinding unit similar to the edge runner mill, however, with better economy as compared to existing grinding systems. Even the ancient oil and paper mills functioned according to this principle. The edge runner mill is used to grind rock, ore or grains. It is equipped with one or two upright heavy-weight discs which roll on their edges, rotating around a vertical axis on a bottom plate and grinding the material. Gebr. Pfeiffer has vast experience with the construction of edge runner mills for wet and dry grinding. The first mills of this type - most of them for the ceramics and clay industries - were already manufactured shortly after the company's foundation.

In 1960, after many tests, the Pfeiffer engineers proudly present the result of their endeavors - the MPS vertical roller mill. Driven by a rotating

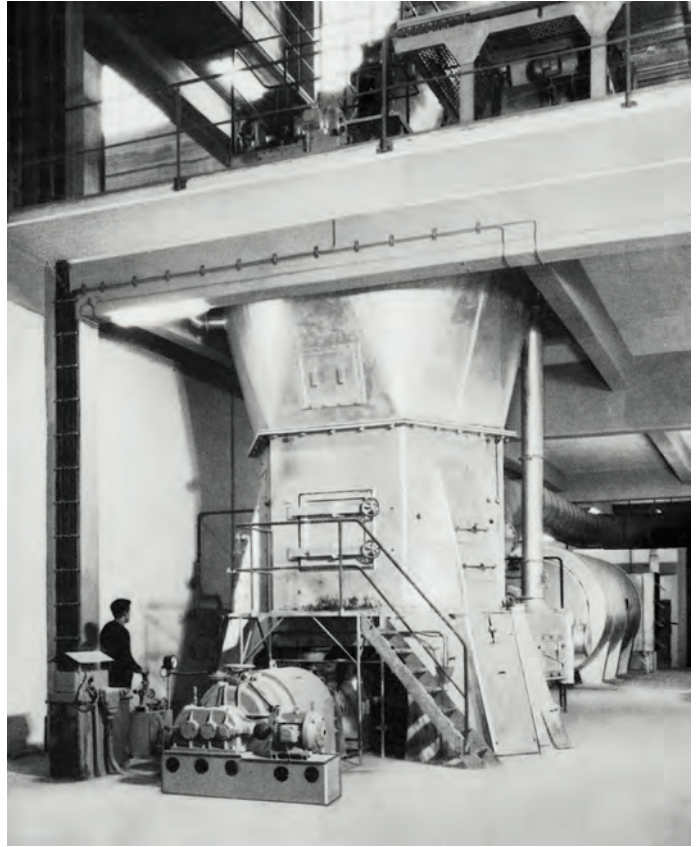
1 The MPS mill designed by Gebr. Pfeiffer in the late 1950s needs less force and space as compared with the systems available on the market until then and is fully automatic in operation. Photo taken in the early 1960s.

2 Test station staff analyze material samples received from customers so that the optimum mill can be rated by the engineers. Photo taken in 1964.

3 View of the workshop in the 1960s.

4 A separator is being assembled in the workshop in the 1960s.

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1 The first three-stage lime slaker made by Gebr. Pfeiffer, operating in a lime works in Switzerland. Until the mid-1960s, plants are supplied to 15 European and overseas countries.

2 Time to take a group photo: locksmith and sheet metal staff in 1958.



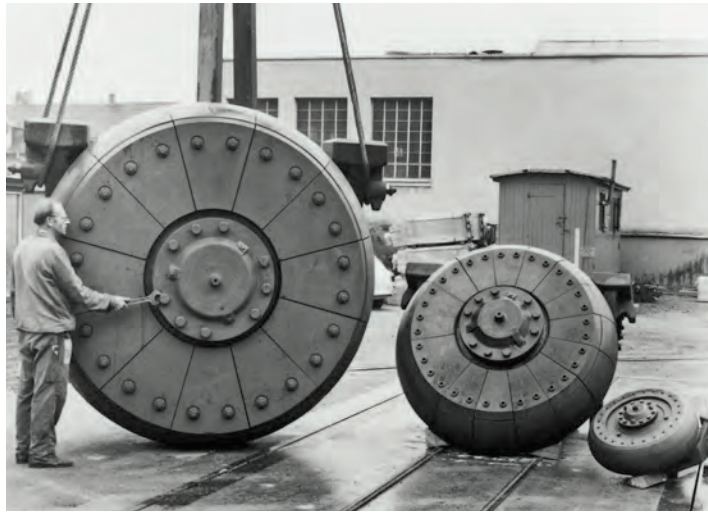
grinding bowl, three stationary grinding rollers grind the raw material, using the high vertical forces of the mill. By directing hot process gases into the mill, the ground material is dried at the same time. This mill needs less force and space, with a reduction of capital investment for buildings, foundations, and procurement. Moreover labor cost decreases thanks to the fully automatic operation of the mill.

The MPS vertical roller mill sets out immediately on its conquest of the international cement industry. It proves to be the ideal cement raw meal grinding plant for the new heat exchanger kilns meant to replace the wet rotary kilns in cement works because the fine-ground and dried raw meal can be injected directly into the kilns.

With the international cement industry experiencing large-scale extension and modernization measures in the 1960s and 1970s, Gebr. Pfeiffer succeeds in being awarded a great many orders for ever bigger and more efficient MPS mills which are constructed, manufactured, and put on line in rapid succession. By the mid-1970s, so many Pfeiffer built MPS mills are already sold that they make up more than 40 per cent of the newly installed raw meal grinding plants in German cement works.

The next step is self-evident: the Kaiserslautern based company sells its MPS mills along with complete grinding plants for cement works situated in countries where Pfeiffer has not been active until then. License contracts are awarded to foreign cement plant manufacturers like Allis-Chalmers or FLSmidth which are going to set up lots of big MPS plants in the years to come. When it turns out that MPS mills are perfectly suited to grind coal for the firing of steam boilers, Gebr. Pfeiffer also awards licenses to suppliers of complete power stations all over the world as for example the company Deutsche Babcock. Until today Gebr. Pfeiffer and its licensees sold more than 2,400 MPS mills in 87 countries.

1 Impressive comparison of sizes: an employee in front of a grinding roller for an MPS vertical roller mill in the mid-1960s.
2 Design department and sales department in 1964.



Successful research and development: Machine park and test station

Gebr. Pfeiffer has a long tradition of constantly improving its machine park and of newly developing machines which is one of the essential factors the company's success story is based on. This is documented by a great number of patents and property rights.

As is shown in the production program of the mid-1960s, Gebr. Pfeiffer constructs and manufactures machines and plants for the preparation of cement, lime, gypsum, ceramic and refractory materials, coal, coke, and fertilizers. Also included in the company's program are machines and equipment for the chemical industry, individual machines and devices for crushing, grinding, separating, drying, slaking, burning, conveying, and dosing. No matter if it is a high-efficiency separator, double hard ball mill or screen ball mill, Molekulator mill, table feeder or granulating table, three-stage slaking machine, hammer mill, roller crusher, gypsum calcining kettle or Triplex dryer: automatic control is available for all of them. At that time the company owns a total of 15 German and foreign patents along with 4 German utility models.

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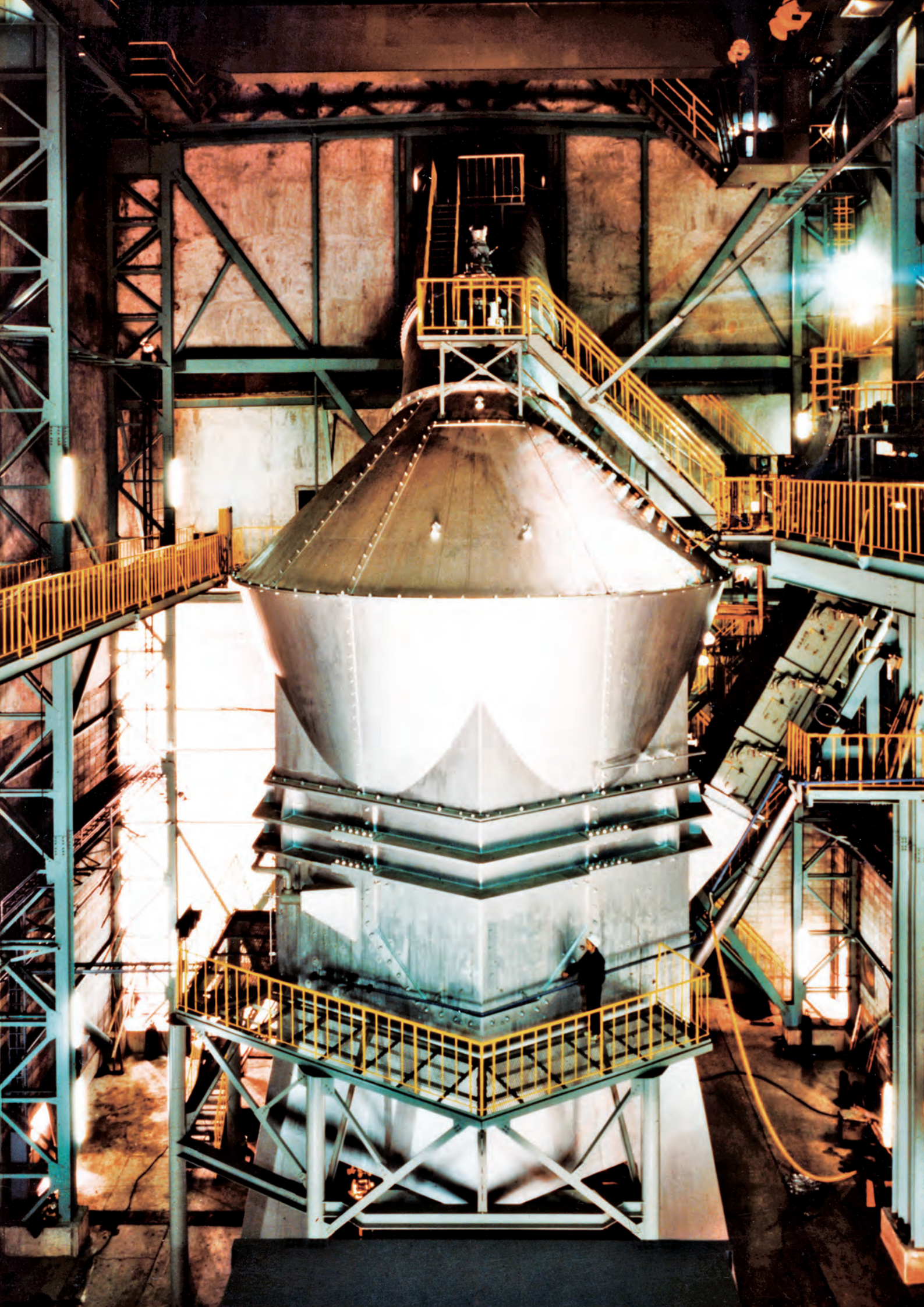


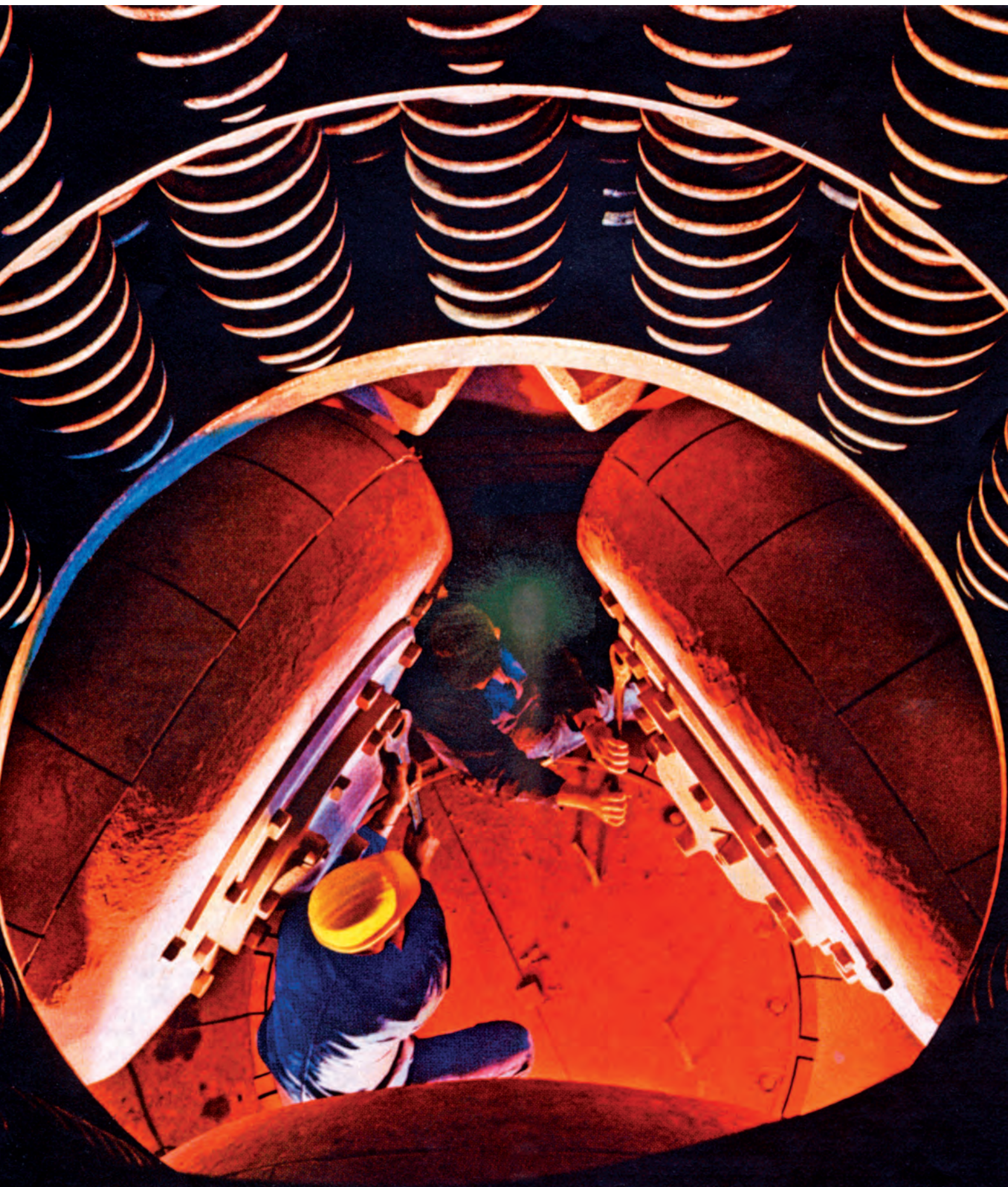


1 | 2 Inside and outside views of the biggest vertical mill in the world at that time, an MPS 4850 A supplied by Gebr. Pfeiffer to Japan in 1976.

In order to maintain this high technical standard, the company's test station is completely rebuilt in 1963, with new equipment representing the state of the art in preparation technology. Customers who wish to test a specific material send it to Pfeiffer for examination at the test station where all of its machines and equipment are available in the smallest size possible, with the related process and control systems, allowing the specialized engineers to examine in every single case which process and machine are best suited for the material and application concerned. The customers may witness the tests, if they wish to, and convince themselves right on the spot of the efficiency and performance of the Pfeiffer machines.

Here again a tradition proves a great success: Gebr. Pfeiffer manufactures premium quality machines in close cooperation with its customers who may indeed rely upon the enduring performance of the products. To be noted that in the mid-1960s, Gebr. Pfeiffer still receives orders from German or foreign customers for spare parts needed on machines that had been supplied by Pfeiffer before the First World War. This does not pose any problem because employees working for the company for a great many years pass on their know-how. In fact many of them have been working for Gebr. Pfeiffer for 10, 25, 40 or as many as 50 years. Such sustainability, which runs through the company's history like a golden thread, is combined with continuous research and development.





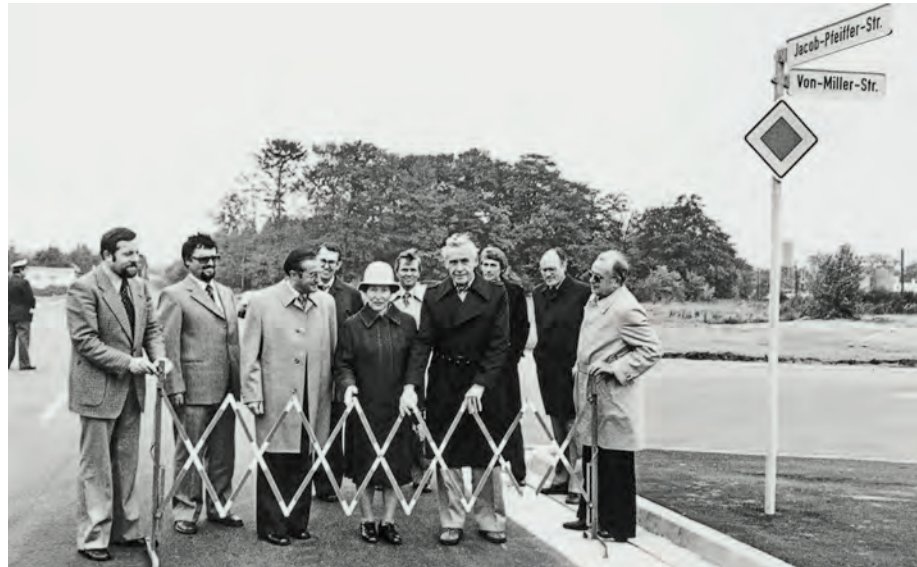
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1 View into the grinding zone of a large-size MPS mill in the late 1960s. The spring system used at the time has meanwhile been replaced with the hydraulic tension system.

2 Lime slaking machine for a North African lime works in 1974.

3 The City of Kaiserslautern honors Jacob Pfeiffer, one of its most significant industrialists, by naming a street in the newly created industrial area after him. Photo taken during the inauguration of the street in the presence of Jacob Pfeiffer's descendants along with representatives of the company and the municipality.



Investing into a modern company

At the time of the company's 100th anniversary in 1964, the financial situation is sound and Gebr. Pfeiffer sets out to do extensive modernization work on its facilities and machine park. By the year 1969, a new dispatch hall is constructed followed by enlargements of the factory halls and the installation of a new works canteen. In 1970/71 a new laboratory and development department is built. Buying part of the neighboring estate in 1973, Gebr. Pfeiffer can extend its premises by one third. During the next two years, the company sets up a mechanical workshop and a new building with modern open-plan offices.

Pfeiffer also invests in large-scale and state-of-the-art machine tools and a rotary melting furnace of the newest generation for the production of high-alloy cast iron to be used for the wear parts of the Pfeiffer machines. This is both for the sake of the employees' working conditions and for the production processes. Again Pfeiffer's principles of business are successfully confirmed: remaining independent of banks and ensuring solid financing with equity capital.

One thing Pfeiffer is particularly proud of is the fact that the company's target, i.e. making all investments without any bank loans, is reached. In 1972 sales figures exceed 20 million DM for the first time, with the worldwide success of the MPS mills improving the company's position in the market. Three years later, sales figures exceed 30 million DM. With the company's own funds, the equity capital is increased gradually from 1.5 million DM to 4.5 million DM between 1973 and 1981.

In the second half of the 1970s, there is an increasing slowdown in investments by building materials producers in central Europe, especially in the cement industry. In the meantime modern works of sufficient capacity are available, the market is in fact saturated. As the business of Gebr. Pfeiffer largely depends on the willingness of the customers to make investments, the company concentrates on opening up various foreign markets to stay on course for success. Direct and indirect exports actually make up 80 per cent of the sales figures in 1977/78. Almost one third of the volume is reached with sales to customers in the Middle East. Gebr. Pfeiffer has established itself as a leader of the world market.

Chapter 5

INNOVATIVE MILL TECHNOLOGY FOR THE GLOBAL MARKET 1978-1994

Increase in efficiency, energy saving, and plainness have been the leading trends in the grinding processes of the building materials industry since the 1970s. One technical milestone is the first MPS vertical roller mill for blast-furnace cement installed in 1980.

Apart from developing new applications, Gebr. Pfeiffer opens up new foreign markets and is very successful in the Middle East and Far East in the 1980s. At the beginning of the 1990s, Pfeiffer mills are to be found on all five continents, providing even increased power and output to the grinding technology with the B-series of the vertical roller mill.



The first blast-furnace cement grinding plant worldwide

The machines designed and constructed by Gebr. Pfeiffer are all tailor made to suit the requirements of the customer, a principle ensuring the company's worldwide success since the late 1970s. Taking even one step further in its R&D activities, Pfeiffer designs a vertical roller mill which can also grind cement. After many tests, the result is presented in 1980: at Teutonia Zementwerk AG in Hannover/Germany the first large-scale grinding plant worldwide with a vertical roller mill - made in Kaiserslautern - for the production of blast-furnace cements is put on line.

Until that date vertical mills were used by the international cement industry only for the production of cement raw meal, limestone meal, and pulverized coal. The special feature of the vertical roller mill MPS 3750 C built by Gebr. Pfeiffer is its being suited for grinding and drying the cement components either in common or separately. Due to the small amount of material dwelling in the mill, a rapid change of qualities is ensured. As compared with a ball mill, the vertical roller mill can save energy in the order of 25 to 40 per cent depending on the material to be ground.

The mill set up in Hannover is going to make history as the first grinding plant for blast-furnace cement built by Pfeiffer and will further be developed for additional applications in the years to come. Meanwhile, a vertical roller mill of the size MPS 5600 BC with an installed drive power for the grinding bowl of 5,300 kW has become the biggest mill of this series which is specially adapted to the requirements of clinker grinding and granulated blast-furnace slag grinding.

Even more options are available for using vertical roller mills: in combination with three-tube dryers for the grinding-drying of ceramic clays, for example, MPS mills are increasingly used. In fact with good deposits becoming rare, clay from contaminated deposits must be used more often and this clay needs to be ground to a higher fineness degree.



PCs are used for the first time in the project handling departments in the 1980s.

Gebr. Pfeiffer goes global

The tailor made mills are the basis of the sound market position of Gebr. Pfeiffer. In 1980 sales figures of an approximate 35 million DM were generated by 340 employees, with a production range of 32 different mill sizes. The plants are sold via more than 30 foreign representations.

As a company firmly linked with the world market, Gebr. Pfeiffer must react extremely fast to any economic developments wherever they take place. When crude oil prices explode on the international petroleum market as a result of the first Persian Gulf War and the subsequent second oil crisis in 1979/80, Gebr. Pfeiffer revives a very early mill application, the production of pulverized coal for cement kiln firing. Once again the company has the right instinct for the situation. In fact many customers switch to pulverized coal firing and therefore install coal grinding plants in their cement works.

Since the early 1980s, pressure among competitors has been rising in all markets Pfeiffer is active in. There is overcapacity in the industrial countries, a drop of sales figures in crude oil production experienced by the OPEC which until then had been keen to invest, the ongoing Persian Gulf War, and the financial problems of the debt-ridden developing countries, all this makes the markets shrink drastically. In Germany, the construction industry and the building materials producers experience a crisis. Nonetheless Gebr. Pfeiffer succeeds in avoiding an important drop in sales figures.

In fact the company reacts by opening up new markets again: in 1982 Gebr. Pfeiffer supplies two MPS mills for a cement works in Jordan, which at that time is the biggest order contracted in the company's history for a single project. In the mid-1980s, Pfeiffer sells three lignite grinding plants for cement works in Turkey followed by several orders in the years to come. Around that time the Kaiserslautern based company puts out its feelers for the first time on the Far East and is awarded an order from a Chinese customer for a grinding plant. In the early 1980s, a business trip to China is still kind of an adventure. For example, members of the Pfeiffer delegation have to wait as much as 24 hours for a phone call to Germany. In 1987 Gebr. Pfeiffer supplies two raw meal grinding plants and parts of a coal mill to a customer in India.

The first big vertical mill worldwide for cement grinding is put into operation in the spring of 1980.

Saving costs with Pfeiffer vertical roller mills

Vertical roller mills have gained acceptance for combined or separate grinding of cement clinker and extenders in the cement industry from the 1990s. Their electric energy consumption is significantly lower than that of ball mills. Moreover, when it comes to grinding various extenders with highly differing degrees of grindability, these components can be ground separately for being mixed afterwards. This will improve the finished product. The MPS vertical roller mills are also suited to grind and dry very moist materials at the same time.

What is also advantageous is the fact that several steps can be combined in one process in a single machine plus the use of huge amounts of hot process gases of low temperatures along with increased plant availability. Thanks to the online operation of mill and rotary kiln and the small amount of raw material to be stored, capital investment is reduced while current consumption is also kept low due to highly efficient classifiers and material circuits provided externally (outside of the mill).

Pfeiffer offers new machines but also tailor made solutions for the modernization of existing plants as customers often wish to increase the capacity of their existing mill. This can normally be done in a relatively short time, improving the overall economy of the plant at reduced costs as compared with setting up a new plant.

Such a rebuild can be offered as an optional service by the company.



By the end of the 1980s, the growing cement markets in countries like Thailand, Malaysia, and Indonesia are coming into focus. The spread of the Pfeiffer mills may in fact be used as an indicator for the degree of development of a country: developing countries create and strengthen their infrastructures, with large amounts of cement needed for the construction of roads, cities, and airports. In the beginning such cement has to be imported but soon cement works are built with the necessary machines.

Nearly half of Pfeiffer's sales are soon going to be made up by MPS mills. The biggest one has an outer grinding plate diameter of somewhat beyond six meters, weighing more than 1,000 tons (including classifier, feed device, and gearbox). Pfeiffer mills are in operation in 56 countries, grinding a total of 34 different materials which are in most cases cement raw meal and coal.

More power for the mills

In the building materials industry, grinding systems with ever increasing capacities are needed. To suit this requirement, Gebr. Pfeiffer is working relentlessly on further advancing the proven system of the MPS mills. In 1994 the company presents the B-series of its vertical roller mill with a mill drive power of as much as 7,000 kW.

Moreover, since the early 1990s, Pfeiffer has been equipping the MPS mills with the third-generation high-efficiency classifiers of the type SLS. Such classifiers with their precise separation can be used for various applications. CFD simulations, small-scale examinations plus Pfeiffer's experience gained over many years culminate in further optimizing the classifier.

Depending on the customer's requirements, Gebr. Pfeiffer can build either complete plants or single machines for the preparation of lime, ceramics, and gypsum. All of these materials are highly demanded in the entire world: lime is mainly used in the iron and steel industry as well as in the chemical industry, in the building materials industry and construction industry, moreover for environmental protection (sewage treatment and air

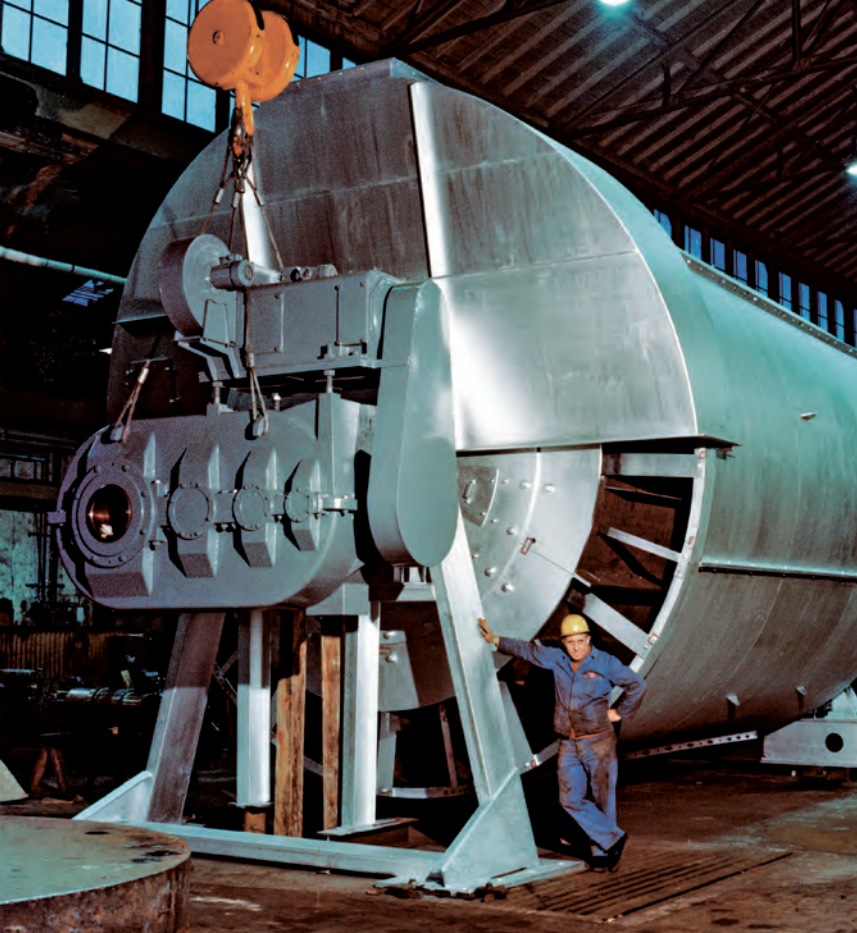
pollution control), finally in agriculture and forestry. There is also a big demand for products from the ceramic industry like bricks, roof tiles, ducts, floor tiles, tableware, and sanitary ware as well as for refractory ceramics and technical ceramics. Last but not least, plaster is an important material mainly used for interior work in the form of gypsum blocks and plasterboard for dry walling, as base material for various wall plasters and dry flooring, as primer and filler.

Increasing quality requirements and a rise in cost pressure demand efficient processes. The machines designed and built by Gebr. Pfeiffer can handle this. Moreover, they comply with regulations on environmental issues which are becoming ever more stringent since the 1980s, as for example sustainability and reduction of CO₂ emissions.

With the MPS mills, Gebr. Pfeiffer has set the benchmark in dry preparation of ceramic raw mate-

MPS 4150 at Intermoselle SARL, Luxembourg, in 1976.





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1 Between 1960 and 2000, Gebr. Pfeiffer supplies more than 170 TRT three-tube dryers to customers all over the world for the drying of most different bulk materials. Photo taken in the early 1980s.

2 From the 1980s, numerically controlled machines are increasingly used for manufacture at Pfeiffer.

rials for instance. This process has also been used for more than four decades in the brick industry whenever high quality products cannot be obtained with the conventional method.

Dry preparation of clay on Pfeiffer MPS mills has one decisive advantage: any harmful substances included in the clay are discharged during grinding very efficiently. Especially the clay quarried in Germany contains more and more of such substances like pyrite and quartz. This is the reason why in the 1990s many producers decide in favor of dry preparation with Pfeiffer mills. During this period Gebr. Pfeiffer sells in fact twelve MPS mills for clay grinding.

Similarly, when it comes to gypsum, Gebr. Pfeiffer demonstrates its competence: the directly heated MPS GC mill is a unit used to grind, dry, calcine and classify gypsum all at once. The finished product from this mill serves to produce plasterboard for example. With indirectly heated gypsum calcining kettles of the type GK, which are also part of Pfeiffer's production range, the starting material for the production of wall plaster is obtained. What can also be done is to combine both machine types to calcine gypsum in several stages. With this process, products with medium to long initial setting times are obtained.

Apart from the fields gypsum, lime, and ceramics, Gebr. Pfeiffer has been refocusing since the mid-1990s on the cement market. With its machines for cement production, the company has been esteemed by customers in Germany and abroad for many decades for its expertise in modern preparation technology in the sectors grinding, separating, drying, and slaking. Without cement there is no concrete and hence no such modern infrastructure like highways, bridges, residential buildings, office buildings, harbors, tunnels, pipelines, lighthouses, museums, schools... The cement market is soon going to be the most important foothold of the company.

Chapter 6

MVR - STEPPING INTO A NEW DIMENSION 1994-2014

The company's strategy - focusing on vertical roller mills for the cement industry - works well: with its reinforced and more powerful B-series of MPS vertical roller mills, Gebr. Pfeiffer lays the foundation for record results in the 1990s. This is achieved thanks to highly motivated and committed employees striving for best team performance. After the turn of the millennium, Gebr. Pfeiffer is staying on course for innovation. As a result the first newly developed MVR vertical mill is sold in 2006. In combination with the MultiDrive® this can be considered a revolution in mill technology.

Gebr. Pfeiffer 2014: the Kaiserslautern-based mid-size company sets about taking cement production into a new dimension in many countries, becoming a technology leader with its newly developed vertical mill.



Successful strategy in times of unsteady markets

From the mid-1990s, Gebr. Pfeiffer has been strengthening its concentration on the development and manufacture of vertical mills for the cement industry which as a result take the largest portion of machines sold. With this strategy involving the introduction of the MPS B-series, the company lays the foundation for success during the following years. The first vertical roller mill with increased capacity, an MPS 5300 B, is sold in 1994 to La Cemento Nacional in Ecuador and is successfully brought on line in a very short time.

Although a general weakness can be seen in the market for building materials machinery, with pressure rising among the competitors, Gebr. Pfeiffer is able to hold its ground also because the company can open up further foreign markets: in 1995 Gebr. Pfeiffer supplies an MPS vertical roller mill to Kolkata - the start of business in India. In the years to come, the Kaiserslautern company succeeds in acquiring a great many renowned customers from the Indian cement and steel industries. Business booms actually so that Gebr. Pfeiffer decides in the year 2000 to found a subsidiary in India to serve the Indian market even better.

At the turn of the millennium, the rising demand for big vertical mills in the cement industry leads to the highest order intake ever experienced in the company's history. The years to come are going to be dynamic: the world market for vertical mills is booming, however, only outside Europe. In 2003 Gebr. Pfeiffer sells the biggest MPS vertical roller mill built until then, an MPS 5600 BC, for the grinding of blast-furnace slag to Tenghui in China. Another large-scale order for ten identical raw mills of the type MPS 5000 B is received in the same year also from a Chinese customer. Later on emphasis shifts from China to India, to the Middle East, South East Asia, and America. There is an increasing number of projects in Africa, and Turkey remains an important market. The export rate rises to above 98%. Good order intake is due to contracts received for complete grinding plants, two of them being for raw meal and pulverized coal for an Indian cement works. But Gebr. Pfeiffer also comes under increased pressure among the competitors: prices are stagnating, causing the company to increase productivity by improving its organization and investing into modern manufacturing equipment.

In the fiscal year 2005/06, sales figures exceed 100 million Euros for the very first time, with the number of employees in Kaiserslautern rising from

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1 With the MVR mill and MultiDrive® (latter shown on the photo), throughput rates of up to 1,000 tph can be achieved with the one-mill solution.

2 In 2010 Gebr. Pfeiffer builds a cement mill MVR 5600 C-4 with four rollers to be set up at the Balaji works in India. Pfeiffer's scope includes all the machines of the overall plant from the feed material dosing system to finished product handling.

3 In 2005 Gebr. Pfeiffer supplies an MPS vertical roller mill for blast-furnace slag grinding to a Chinese customer.



267 in the preceding year to 310. Moreover, the staff of the Indian subsidiary are increased. The same applies to the staff number of the U.S. subsidiary founded in 2005. Gebr. Pfeiffer profits from globalization thanks to its diversity and presence in the world's markets. Two years later, economy gains further momentum, ensuring full order books for the company, with an order intake of more than 230 million Euros only for fiscal year 2007/08. This is a financial cushion against the shocks of the worldwide economic and financial crisis of 2009: whereas many industries are suffering from the financial crisis, especially automakers, Pfeiffer is working off the long list of orders received. By the end of 2008, the market for building materials machinery has collapsed almost entirely but the manufacturing facilities of Gebr. Pfeiffer are under full workload. There is short-time work and staff reduction in many industrial sectors whereas the number of employees at Pfeiffer even rises to 378. The company provides 111 new jobs within 3 years only. During this period, Gebr. Pfeiffer succeeds in introducing new and more efficient products on the market.

Revolutionizing mill technology: MVR vertical mill

From the turn of the millennium, the cement industry has been demanding ever increasing throughput rates. Drive power ratings of as much as 12,000 kW are being considered. In 2001 Gebr. Pfeiffer devises an ambitious plan: a new design for vertical roller mills, allowing a drive power of more than 10,000 kW and a specific throughput rate of more than 1,000 tph.

In the development groups combining specialists in process technology and design, the Pfeiffer engineers work on the new technology. They construct a pilot plant at the company's test station and make sure that consumption, wear, and throughput of the new system meet the expectations.



At the Pfeiffer Convention 2012, almost 200 guests are welcomed to Kaiserslautern. Whereas the main topic of the previous convention was the introduction of the innovative MVR mill system with MultiDrive®, the participants of the 2012 convention are informed of the very good operating results of the new mills and drive systems.

In 2006 the very first MVR vertical mill is sold so that shortly afterwards the practical testing phase is started in industrial production. Operating results are very good indeed. The owner is Hauri, a producer of mineral materials in Southwestern Germany, who for the purpose of works extension adds this new MVR mill to the existing MPS mills. Other customers, too, decide in favor of this new mill type: one is sold to Fabrika Cementa Lukavac in Bosnia-Herzegovina, another one to Jaypee Group of India, both mills working successfully.

The trend in the cement industry that calls for grinding plants with ever increasing capacities is still going strong. Plant availability and maintenance optimization are becoming more and more important. Gebr. Pfeiffer is able to comply with these customer requirements as well, presenting solutions at the 2010 Pfeiffer Convention. Organized for the first time in 2005, this event takes place every two or three years. In 2010 a great number of guests from more than 40 countries meet in Kaiserslautern, among them customers, representatives, professional associations, companies Pfeiffer has been in close contact with for years... The guests of honor invited to the 2010 Convention come from those works where the first MVR mills and new MultiDrive® systems have been put on line.

At the Convention, an innovative principle is presented: the new vertical mill for the grinding of cement raw material, cement, and granulated blast-furnace slag with a maximum of six grinding rollers and a new drive system developed by Gebr. Pfeiffer in cooperation with Siemens/Flender. The so-called MultiDrive® is composed of three to six identical drive modules, each with an installed power of up to 3,000 kW, driving the grinding table via the girth gear located under the table. Both the grinding rollers and the drives are designed according to the active redundancy principle meaning that whenever a roller or drive module is not available, the mill may continue operating. This ensures a significant reduction of unplanned shutdowns. With the MVR mill in combination with the MultiDrive® throughput rates of more than 1,000 tph can be reached.



His great-grandfather was a foundry caster, his grandfather a foundry moulder, his father a foundry mechanic. Their fourth-generation descendant Ralf Diehl works with the spare parts service of the project and sales department. Altogether the entire Diehl family has been working for Gebr. Pfeiffer for more than 100 years.

Revolutionizing the vertical mill technology, this new mill concept is the very first worldwide to provide the "one-mill solution" even with a high plant capacity. It means that a single mill may now be used instead of two mills that had to be installed in parallel to achieve the high throughput rates envisaged for raw meal or cement. Due to the active redundancy there is a high degree of availability, even in big cement works installations, that has not been achieved so far. All of the essential mill components are manufactured or machine-finished and assembled in Kaiserslautern - starting with the cast part from the

company-owned foundry and ending with the complete roller unit.

With its MVR vertical mill with MultiDrive®, Gebr. Pfeiffer has become a leader in this technology, giving a good example of the company's corporate culture of teamwork and excellent collaboration as many employees were integrated into the development process to profit from all of their expertise.

"Ich schaff' ins Peiffers"

This typical Palatinate saying means "I work for Pfeiffer", with the connotation "I'm part of the whole". The mills and other machines are all tailor made based on the employees' vast know-how in design, construction, projecting, and manufacturing. Apart from their rich experience, all men and women working for Pfeiffer have a very strong feeling of attachment to the company, which is often true for entire families: Gebr. Pfeiffer is indeed a family company not only because it still belongs to the founders' family but also because many of the company staff are second, third or even fourth generation employees. The company is particularly proud of the low fluctuation of staff as most employees stay working for Pfeiffer for decades. At the beginning of 2014, Gebr. Pfeiffer has 404 employees in Kaiserslautern. 121 of them have been with the company for more than 10 years, 51 for more than 25 years, and 21 for more than 40 years.

Various programs ensure a continuing vocational training. Gebr. Pfeiffer also has a long-standing tradition in apprenticeship training and is often

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1 In 2008 40 Pfeiffer employees take part in the "Palatinate Company Run". In 2013 even 79 line up for the group photo. And for the run of the anniversary year, at least 150 employees are going to be on the Pfeiffer team.

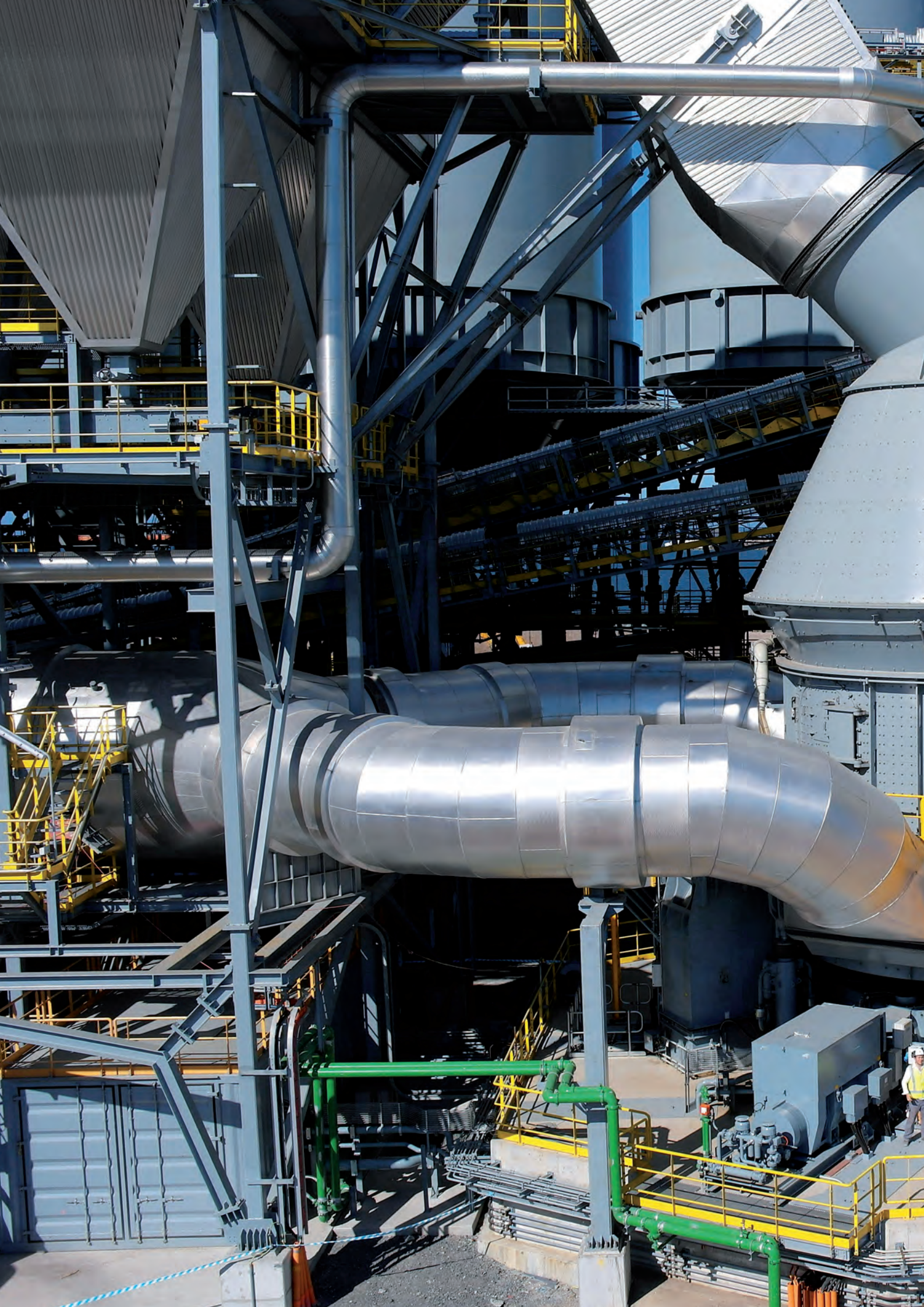
2 During the 125th company anniversary, the founders' descendants and owner family pose for a souvenir photo in Jacob Pfeiffer's villa. In front his granddaughters who can also be seen on the photo on page 29 and who used to play on the works premises.



pleased to learn the very good results of its apprentices. Moreover, the company offers the possibility for young people to do an internship relating to their field of study at the schools they normally go to. Most importantly, Gebr. Pfeiffer tries to attract graduates from universities in the region. Colloquially called "Pfeifferianer", the typical Pfeiffer employee is down to earth while being open-minded as well and is fond of working in the team, of getting things moving by proactively contributing to the needs of the company.

Every Pfeiffer built machine is the result of teamwork. Before a mill can be put on line, the company's employees must carry out grinding tests with the material to be ground. Then the performance parameters are defined by process and design engineers to allow the mechanical engineers to start out on constructing various parts. Patternmakers prepare the models to be used in the foundry where machine parts are cast from iron.

The parts, which often weigh a ton or more, are machine-finished in the mechanical workshop before they are assembled. Pfeiffer supervisors travel to customers' sites the world over to coordinate and monitor the entire erection work. The commissioning engineer stays on the site until the plant functions as planned and until all performance guarantees agreed upon are fulfilled. No matter how many specialists and versatile activities are involved - process and mechanical experts, toolmakers, industrial managers, project managers, IT experts - there is always one common denominator: "Progress is our tradition" which is experience combined with the readiness to face modifications and new tasks. In 2012, the Pfeiffer staff face quite a special challenge: nearly all of them are somehow involved in the construction of the biggest vertical cement mill ever built in the world...







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1 | 2 To submit optimum solutions to specific customer requirements, all important parameters to be considered for the rating of the machine are determined on pilot plants at the test station and the appropriate process is selected accordingly.

3 Raw materials are examined with a view to their processing behavior and are characterized in the company's own laboratories considering relevant standards.

Superlative mills and highly satisfied customers

Received from Holcim of Brazil, the order to build the biggest cement mill of the world is a technological quantum leap to be made by Gebr. Pfeiffer. The individual parts of the MVR 6700 C-6 producing up to 450 tph of cement are being manufactured in Kaiserslautern. Erection in Brazil is going to be finished by the end of 2014. The mill will be equipped with a MultiDrive® with six drive modules and a total power of 11,500 kW. Hence the MVR mill has a power rating that has never been achieved so far. Another superlative mill is set up in Australia in 2013: Pfeiffer supplies the biggest vertical mill for cement grinding on the fifth continent. The customer, Cement Australia, is the leading Australian cement producer who decided in favor of a Pfeiffer-built vertical mill of the type MVR 6000 C-6 with a MultiDrive®. As requested by the customer, delivery and commissioning are to be performed in a very short time.

Gebr. Pfeiffer copes with the task quite brilliantly: the heavy components weighing more than 100 tons are pre-mounted for transportation to Australia and are mounted on the site. It is no problem either to send spare parts from Europe in a short time. This is how Gebr. Pfeiffer guarantees both continuous operation and production as envisaged. It is proven one more time that foreign customers rely upon the Pfeiffer technology for vertical mills also because the Pfeiffer specialists come to the site to supervise erection and commissioning of any mill supplied.

In India, Gebr. Pfeiffer can achieve consecutive records with "the biggest throughput", "the highest installed power" or the "shortest project implementation time". In 2013 the 100th Pfeiffer vertical mill on the Indian sub-continent is supplied to Shree Cement. This customer decides in favor of the vertical mill of the type MVR 6000 C-6 mainly because of the low specific capital investment and low energy consumption during grinding.

Only three months after signing the contract for the 100th Pfeiffer mill, there is another reason to celebrate: the same Indian customer awards orders to Gebr. Pfeiffer and its Indian subsidiary, Gebr. Pfeiffer (India) from Noida/Delhi, for five additional vertical mills, four of them of the type MVR. The core components of the mills and the gearboxes will be delivered from Europe whereas the mill housings, classifiers, and foundation parts will be manufactured by the Indian subsidiary. Hence Shree Cement has ordered the greatest number of mills as an individual customer of Gebr. Pfeiffer.

Previous page: The biggest cement mill of Australia has been operating since 2014.

1 Thanks to the high vertical integration of the manufacturing facilities in Kaiserslautern, from the cast part produced in the company foundry to the complete grinding plant, most of the mill components are in fact manufactured in Kaiserslautern or at least machine-finished and assembled.

2 In 2013 the subsidiary Gebr. Pfeiffer (India) founded in 2000 can move into the newly constructed building in Delhi which is owned by the company.



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Follow-up orders are a clear indicator of customer satisfaction. Like for example, seven vertical mills supplied to the Turkish customer Limak Çimento in 2013. Back in 2009, the Kaiserslautern-based company supplied a coal mill and a raw mill to Limak Çimento. Pfeiffer also establishes itself on the Colombian market as a renowned supplier of vertical mills by delivering several raw meal, coal, and cement mills.

In Southeast Asia, Gebr. Pfeiffer performs successfully on the booming Indonesian market as well, with the supply of five vertical mills scheduled for 2014. One of these mills is an MPS 4500 BK which is the biggest vertical mill for coal grinding in the world, with a throughput of 100 tph. Two more MVR vertical mills for raw material grinding are bound for Lafarge in North America and Canada. The company has still further mills to supply in the anniversary year, for example to Poland, Russia, Togo, Iraq, Turkey, Malaysia, and South Korea.



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Modernizing for the future

During the past 25 years, Gebr. Pfeiffer has constantly been extending and modernizing its production facilities in Kaiserslautern. The company's readiness to adapt to the newest developments can also be seen through the most recent construction work carried out to get the factory prepared for handling the huge parts of the new large-size mills.

In 2010 big factory halls covering a total 1,450 m² are built along with covered storage areas and a new office building. Thanks to installing environment-friendly heating systems in the production area, heating costs can be reduced significantly. A major item of such construction work is the new assembly hall finished in 2012, with a building volume of more than 17,000 m³ and a total surface of 1,065 m². The assembly area covers roughly 915 m². The overhead crane is 71 m long, with two rails, 10.6 m hook travel, and maximum hook load of 100 t. This crane is perfectly suited for handling heavy parts during assembly and loading.

1 Mechanical workshops and a foundry are part of the Kaiserslautern facilities of Gebr. Pfeiffer. All phases of product creation are carefully planned, with systematic monitoring and documentation of quality in accordance with the quality management system.

2 Machining of a roller body at the mechanical workshop.



Progress is our tradition - success story to be continued

Gebr. Pfeiffer is looking back on its long, successful history. The family company founded in Kaiserslautern in 1864 expands during the German Empire, becoming a specialist in preparation technology and celebrating its first successes worldwide with wind separators and wind selectors. Shortly after the foundation, machines are already supplied to the cement industry. The production program is soon enlarged by machines developed by the company. Thanks to technical innovations like the three-roller mill, Gebr. Pfeiffer is able to hold its ground throughout economically difficult times of wars and crises.

After the Second World War, Gebr. Pfeiffer returns to the world market, presenting very successfully its vertical mills among which is the

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1 In the new assembly hall, components of the MVR mill are ready for further assembly.

2 Four grinding rollers, each with an axle, can be seen. The new MVR mills are similar to the proven MPS mills in many aspects like process design, safety features, height of grinding forces, classifiers, and wear parts. What has been changed though are throughput rates, number, geometry and suspension of grinding rollers, as well as drive system (MultiDrive®).

first worldwide to grind blast-furnace cement. Following the development of the MPS vertical roller mill, the newest milestone in the Pfeiffer history is the revolutionary MVR vertical mill. The company has always encouraged intensive research and development along with a constant update of its machine park and test station. To be mentioned as factors for Pfeiffer's success: a wide range of products, a modern test station, large design and development capacities, skilled and committed employees, manufacturing facilities with high vertical capacity.

As an experienced and competent partner in the cement, lime, gypsum, and ceramics sectors, Gebr. Pfeiffer has been enjoying the confidence of customers around the world for many decades. 400 employees work in Kaiserslautern. In fact Pfeiffer is known on the extremely competitive market as a company that manufactures almost all of the core components on its own, thus being able to guarantee the highest quality standards. In its subsidiaries in India, in the United States and China, another 80 persons work. There is actually a network around the globe including a representation in the United Arab Emirates as well as cooperations and sales agencies. In 2014 exports will be accounting for more than 98 per cent.

Since its foundation, Gebr. Pfeiffer has had a major part in the development of modern preparation plants in the sectors of grinding, separating, drying, slaking, and calcining. What the company has been standing for are machines and plants of premium quality, availability and economy, customer orientation and presence on the international markets. These remain the standards Pfeiffer is staying committed to while the environment is changing rapidly. For its customers the company elaborates innovative solutions to problems including overall systems, aiming at ensuring a long-term cooperation as partners.

As demonstrated by the long and successful history of Gebr. Pfeiffer, the company from Kaiserslautern received confirmation from all over the world of its first-class performance in the past. In the present time as well, the company is perfectly prepared to cope with new challenges. The success story will go on...

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References

Archives of Gebr. Pfeiffer SE, Kaiserslautern. To be noted that a complete list of references is available with Gebr. Pfeiffer SE.

Literature (excerpt)

Ein Jahrhundert Arbeit für die Aufbereitung von Steinen und Erde 1864-1964, hrsg. von Gebr. Pfeiffer AG, Kaiserslautern 1964.

Ernst Christmann, Heinz Friedel, Kaiserslautern einst und jetzt, 2. Aufl., Kaiserslautern 1976.

Spezialized magazine: Global Gypsum, laufende Jahrgänge.

Thomas Kaczmarek, Bundesverband Kalksandsteinindustrie, 100 Jahre Kalksandsteinindustrie, Hannover 1994.

Konjunkturperspektiven, hrsg. vom Bundesverband Baustoffe - Steine und Erden e.V.

Albert Munzinger, Die Entwicklung der Industrie von Kaiserslautern, Kaiserslautern 1921.

Kreuz, Rad, Löwe. Rheinland-Pfalz - ein Land und seine Geschichte, hrsg. von Friedrich P. Kahlenberg und Michael Kißner, Mainz 2012.

Manfred Pohl, Geschäft und Politik. Deutsch-russisch/sowjetische Wirtschaftsbeziehungen 1850-1988, Mainz 1988.

Joachim Radkau, Technik in Deutschland vom 18. Jahrhundert bis heute, Frankfurt 2008.

Erhard R. Wiehn, Kaiserslautern. Leben in einer pfälzischen Stadt, Neustadt 1982.

Spezialized magazine: ZKG International, laufende Jahrgänge.

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1925 - 1934	OTTO MEHRENS
1934 - 1935	KARL RAQUET
1935 - 1937	OTTO MEHRENS
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since 2011	DR. ROBERT SCHNATZ technical



Everything began in the year 1864 with a small machine building factory in Kaiserslautern. 150 years later, Gebr. Pfeiffer has 400 employees in Kaiserslautern and subsidiaries in India, in the United States and China. The worldwide network also includes a representation in the United Arab Emirates as well as many cooperations and sales agencies.

Gebr. Pfeiffer SE is renowned all over the world for its excellence in grinding technology. The book tells the changeful and exciting story of the company, its innovations, consequent customer orientation and ongoing international presence.



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Progress is our tradition