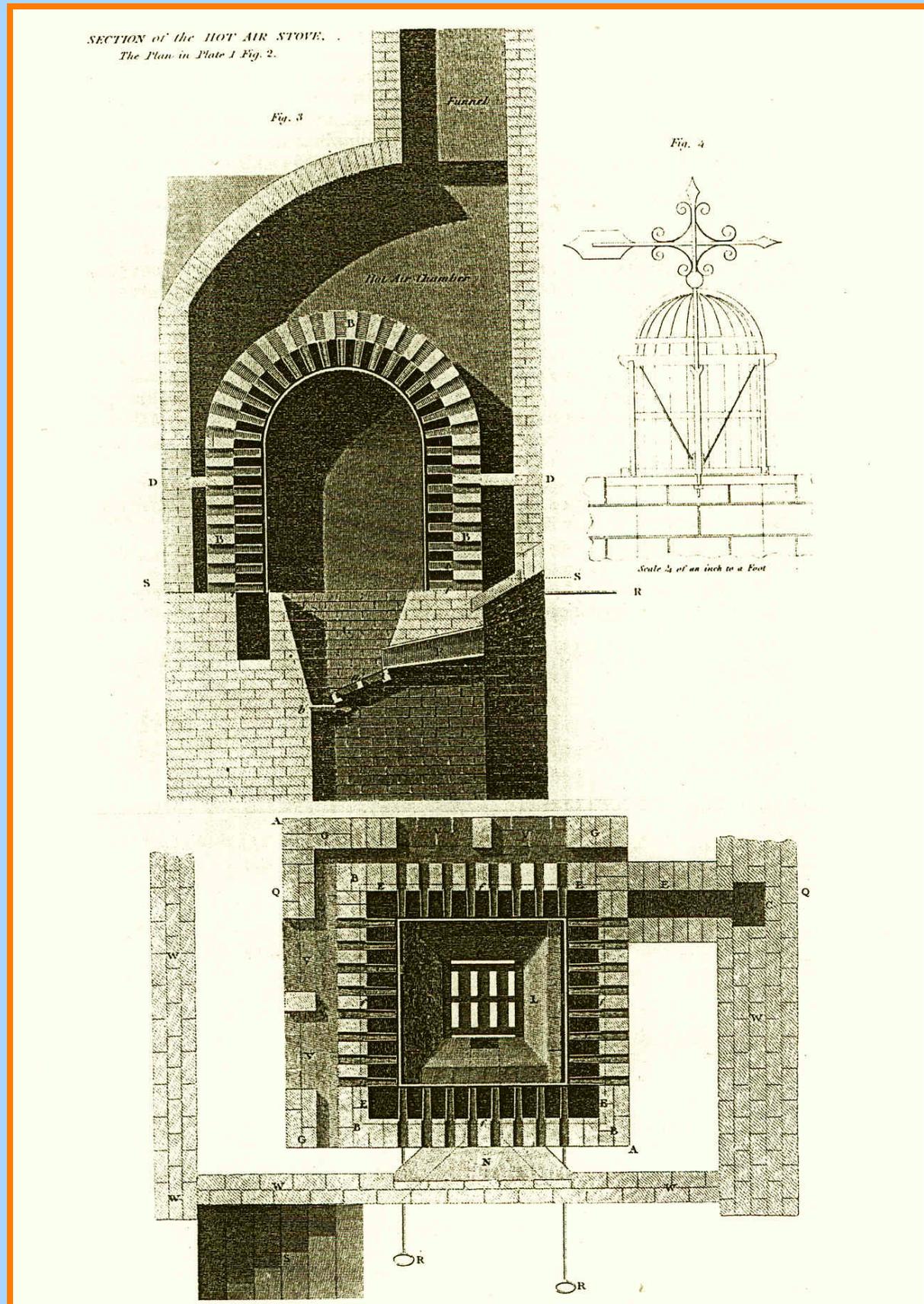


The story of
Rosser & Russell



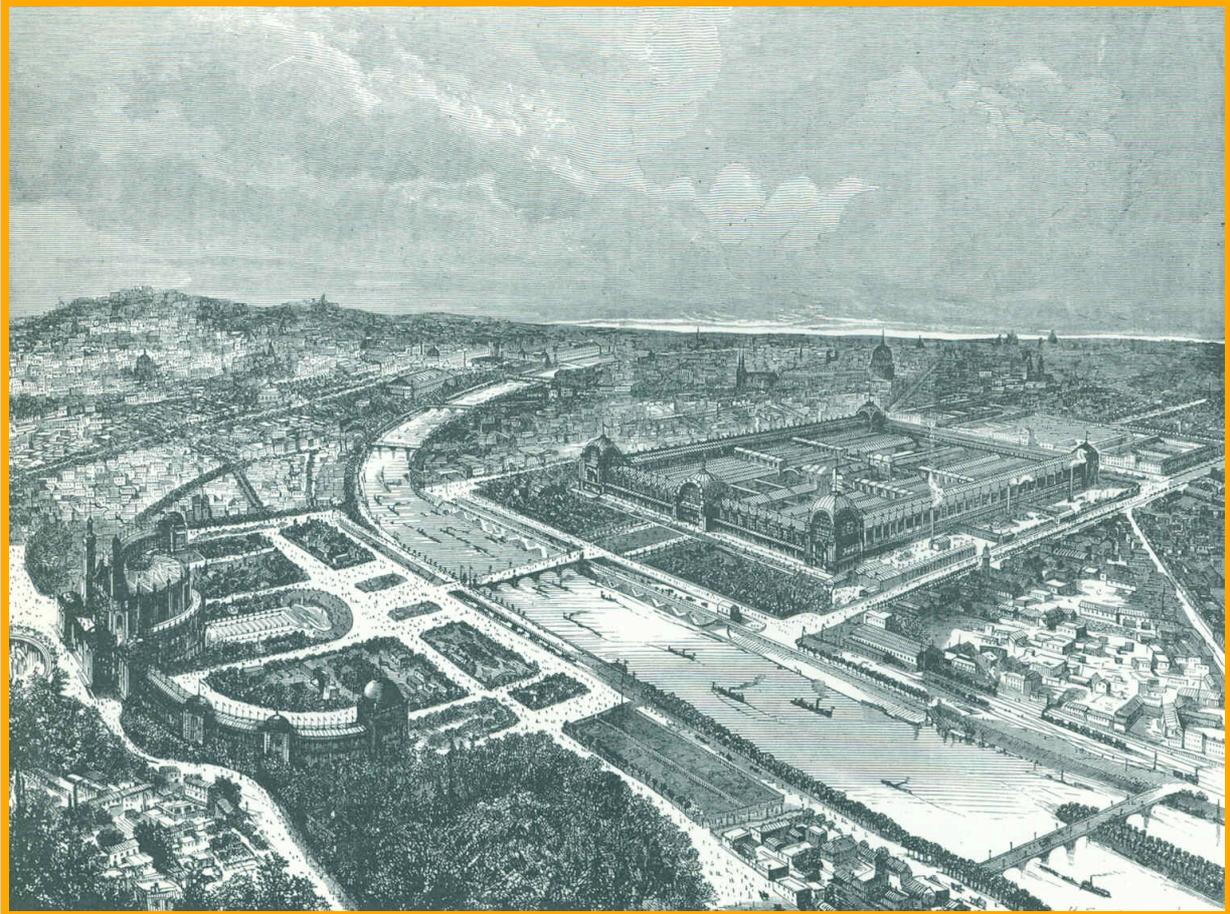
Section (top) and Plan (below) of William Strutt's heating cockle in the basement at Derbyshire Royal Infirmary, where he was assisted by Charles Sylvester, 1807. The fire is contained in an iron casing that heats the external air passing through the inner firebrick casing via metal nozzles. The funnel (upper part of section) discharges warm air to the upper floors. An extract cowl (top right) removes vitiated air [Philosophy of Domestic Economy, Chas Sylvester, 1819].

The story of
Rosser & Russell

Researched, written and produced by
Brian Roberts & Paul Yunnie
of the CIBSE Heritage Group



*Kitchen range at Osborne House, IoW, c.1850
Doors are marked "J Sylvester Engineer London Patent."*



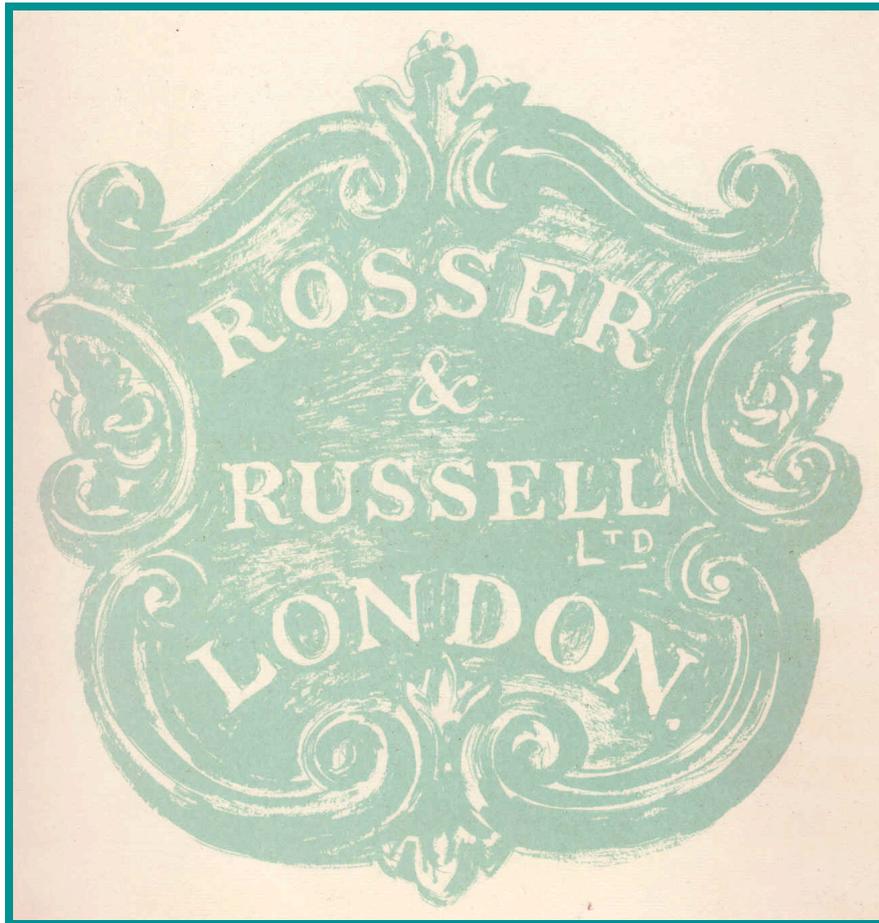
The Paris Exposition of 1878 [The Graphic 1878]

Rosser & Russell was awarded the Silver Medal for an exhibit described as containing, "A fire and steam stove, a hot-water stove, an air-warmer for churches and other buildings, boilers, steam cooking pans for institutions, a hydraulic lift and a reversible (back-to-back) grate."

Credits

Brian Roberts and Paul Yunnie have each spent all their working life in the building engineering services industry and have a particular interest in its history, being Chairman and Vice-Chairman respectively of the CIBSE Heritage Group [www.hevac-heritage.org]

The authors acknowledge the following sources of information and pictures: *Rosser & Russell Limited: The First 200 Years* by Ian Murray Leslie, 1974; *This Record of E N Russell's Business Life Deals with his Service with Rosser & Russell Limited from the Year 1916 to the Year 1948*, unpublished manuscript by E N Russell in the CIBSE Heritage Group Collection, 1979; *The Comfort Makers* by Brian Roberts, ASHRAE, 2000; *The Builder*, *IHVE Journal*, CIBSE Library, CIBSE Heritage Group Collection and the records of Rosser & Russell Limited.



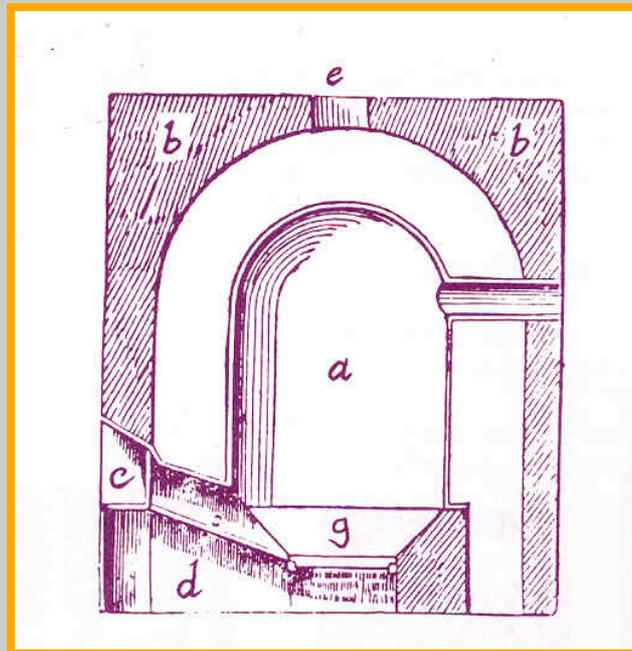
Introduction

Rosser & Russell was founded in 1866 when Samuel Egan Rosser took Joseph Russell into partnership.

The predecessor firm of S E Rosser was so named when Rosser took over the established heating and engineering business of Sylvester & Co upon the death of John Sylvester in 1852. John had inherited the business from his father Charles, who set up the firm in 1820. Charles had joined William Strutt of Derby in 1807 to assist in the development of warm air heating systems.

Thus the origins of Rosser & Russell can be said to date back to the beginnings of the 19th century.

Samuel Rosser died in 1877. Rosser & Russell was incorporated in 1890, the Directors being Joseph Russell, John Sylvester Rosser (son of Samuel) and J Nelson Russell (son of Joseph). Around 1900 the firm described itself as "Heating, Ventilating and Mechanical Engineers." Since then the firm has come through two World Wars and the Depression, and during the course of the 20th century established an enviable reputation for quality engineering. This book shows just a part of that proud history: the buildings, the engineering and the people.



Strutt's Cockle Stove

a cockle *b* brickwork *c* fuel door
d ashpit and draught hole *e* aperture to room or shaft *g* grate

“The furnace itself consisted of a circular iron pot with a rounded top or dome.

The fuel was consumed on a grate at the bottom of the furnace.

Coal or coke was added through a charging door at one side, while primary air was supplied through a duct to a chamber below the grate.

The furnace was surrounded by a brick chamber where the air was heated by direct contact with the firepot.

In Strutt's installation, air was brought from outside the building in a tunnel having an area of four square feet. The warmed air was distributed to the various parts of the building in brick ducts.

The stove at Derby Infirmary was operated at a surface temperature of 150 degC and was able to warm 500 m³/h of air to 55 degC before discharge.

Arrangement was made to extract the vitiated air by means of further airways connected to a funnel on the roof of the building.

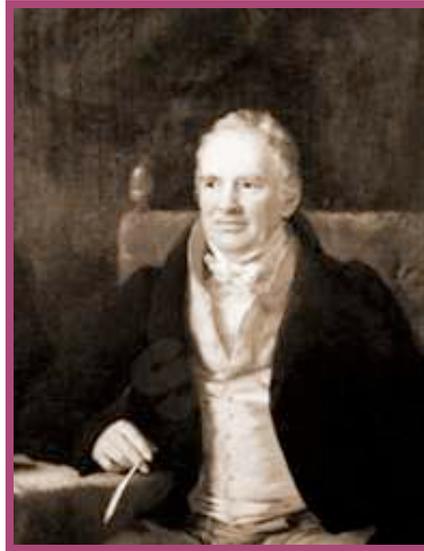
Strutt's cockle was adapted and improved by Charles Sylvester and marketed with some success, particularly to warm halls, staircases and passages.”

Building Engineering Services: A Review of Its Development,
 Neville S Billington & Brian M Roberts, 1982

The Strutts of Derby



Jedediah Strutt 1726-97



William Strutt 1756-1830

Jedediah Strutt was born to a farming family in South Normanton in Derbyshire and trained as a wheelwright. He later invented a stocking frame for the hosiery industry that was patented in 1758 and 1759 and became known as Strutt's Derby Ribbing Machine. In 1771 in partnership with the financier Samuel Need and Richard Arkwright, inventor of the spinning frame, a water-powered factory was set up in Cromford. When Need died in 1781 the partnership was dissolved and Strutt built himself mills at Belper and Milford.

Jedediah had three sons: William, George Benson and Joseph. He also had two daughters Elizabeth and Martha. The three sons entered the business. The Strutts provided housing, religious instruction, church, clean water, swimming baths and gardens for the workers.

The youngest son, Joseph, became the first Mayor of the reformed borough of Derby, taking office in 1835. Joseph and his wife had a daughter, Isabella, who married Howard Galton of Worcester. Isabella had a son, Douglas, who was to become Sir Douglas Strutt Galton (1822-99), an acknowledged expert on sanitation, heating and ventilating (he invented the Galton grate) and hospital construction. (The Galton family could also trace links to Charles Darwin and Josiah Wedgwood).

The eldest son, William Strutt, was of great mechanical ability. He shared ideas on fireproof building techniques with Charles Bage who introduced the first iron framed building in 1796. Fire was a major hazard in mill buildings since the fibres and dust could spontaneously ignite. When one of the Strutt mills, a wooden building of 1786 was destroyed by fire in 1803, William replaced it with one of the earliest fireproof mills (North Mill, 1804).

William Strutt also applied himself to heating problems and invented the Belper or cockle stove in about 1791. Later, with Charles Sylvester this system was used for warming at the Derby Infirmary. In 1820, Sylvester set up in London the heating and engineering firm that was to become Rosser & Russell.

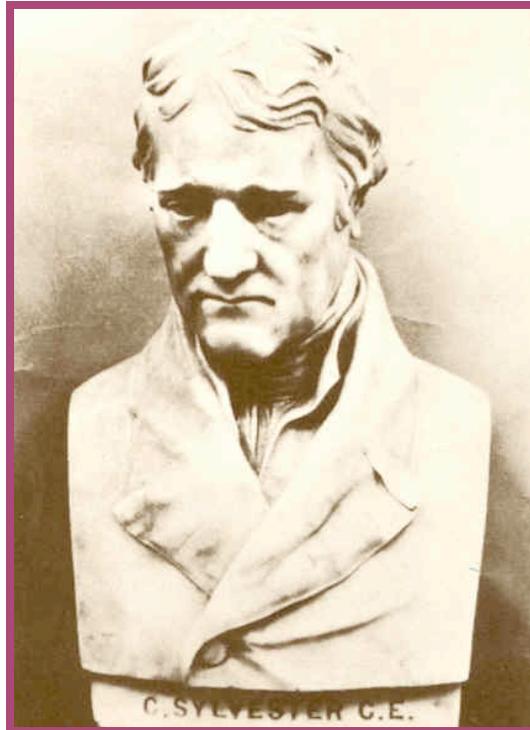


Derby General Infirmary built 1806-10. Arranged over three floors by William Strutt to the designs of a Mr Browne. Described by the German writer and traveller Schinkel who wrote “the famous infirmary, beautiful, convenient in every respect, with a superb staircase, the treads faced with lead.” He refers also to air heating, lavatories, baths and laundry “all very intelligently arranged.”



Belper North Mill, 1803-4 designed by William Strutt. Schinkel called this mill “the most beautiful in England” but he was not allowed inside.

Charles Sylvester CE Chemist, Inventor, Engineer 1774-1828



Charles Sylvester who was born in 1774 received no formal education, but from around the age of 18 taught himself to read while supporting his family by his labours as a plated-wire worker in Sheffield. In the early 1800s he took out a series of patents, the most famous of which related to metal galvanising (BP2842: 1805). In 1807 he and his family moved to Derby where he took employment with William Strutt FRS, head of the Derby Foundry. Sylvester worked at the Derby Foundry and also on a heating scheme for the Derby Infirmary. It has been recorded that “William Strutt certainly recognised his value as an engineer, for he soon had him working on the development and installation of ventilating systems.”

In his treatise of 1819, *The Philosophy of Domestic Economy as Exemplified in the Mode of Warming, Ventilating, Washing, Drying and Cooking*, Sylvester wrote:

“If science can really contribute to the happiness of mankind, it must be in this department of life, the home, as the real comfort of the majority of men, particularly in this country, is sought for at their own firesides. How desirable, therefore, does it become to give men every inducement to be at home, by directing all the means of philosophy to increase domestic happiness.”

In 1820 Sylvester and his family moved to Great Russell Street in Bloomsbury, London, where he continued his work as a heating engineer, chemist, inventor and man of science. In 1824 he was appointed by the Committee of the Liverpool and Manchester Projected Railway to report on George Stephenson’s first public railway. Shortly afterwards, at the age of 54, he died, leaving to John his son, his patents and the business.

John Sylvester 1788-1852

In 1820 Charles Sylvester moved with his family to London. When he died in 1828 he left his patents and his business to his son John who had already demonstrated the same streak of inventiveness. In 1822 John had patented improvements to heating stoves.

He also developed an interest in marine engineering and the *Proceedings* of the Institution of Civil Engineers, reporting on the explorations of Captains Parry and Ross (searching for the North-West Passage) noted that “these celebrated leaders and others ascribe the health of the crews in great degree to the excellence of the system (of scientifically planned heating, cooking and ventilation which enabled the expeditions to remain in Artic waters for as long as two years) John Sylvester devised.”

Little is known of John Sylvester’s endeavours in the field of heating and ventilating. He worked with the architect James Pennethorne, providing heating and ventilating for the Museum of Economic Geology in Jermyn Street/Piccadilly [*The Builder*, 1848/522] and about 1850 provided the kitchen range at Osborne House, the residence of Queen Victoria and Prince Albert, on the Isle of Wight. Two examples of his heating inventions were displayed at and shown in the catalogue of the Great Exhibition of 1851, being commended for their “novelty of principle, design and workmanship.”

John Sylvester died in 1852. He left his patents and the business to his brother-in-law Thomas Creswick and his friend John Jobson Smith, in trust for his two sisters. An obituary [*Proc.ICE*] describes him as “a man of original views and great determination, which frequently led him to do more than required, or calculated in his own interest. A novel application or an unforeseen difficulty to be overcome, had charms for him to which the greatest ordinary success appeared tame.....A good man and a valuable member of society.”



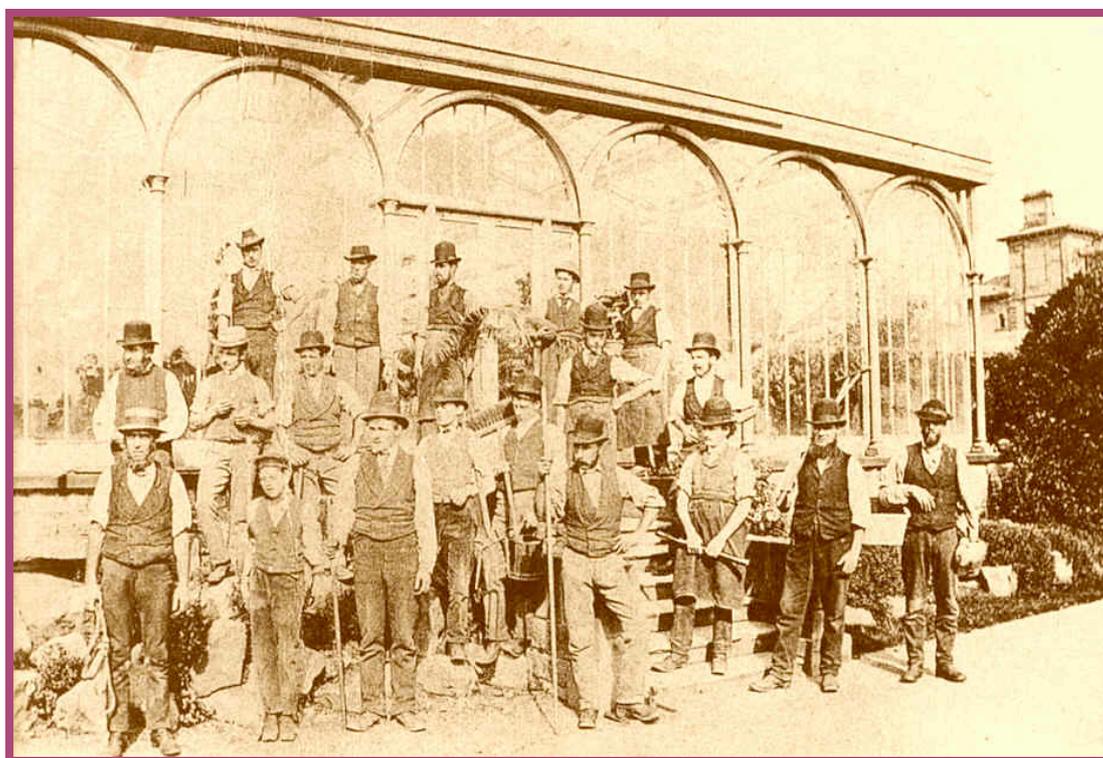
Samuel Egan Rosser 1821-77

Upon the death of John Sylvester, the running of the business was taken over by Samuel Egan Rosser, who had previously been Sylvester's managing clerk. Rosser was born in Sittingbourne, but had originally worked for Sylvester in Derby looking after the firm's heating contract for the Infirmary. He carried on the business from Great Russell Street in London as Sylvester & Co until about 1856, subsequently changing the Company name to S E Rosser, "engineer and heating apparatus manufacturer." He took over the business of Burbidge & Healy (boilermakers) of Fleet Street, and moved both office and works to Northumberland Street, off the Strand.

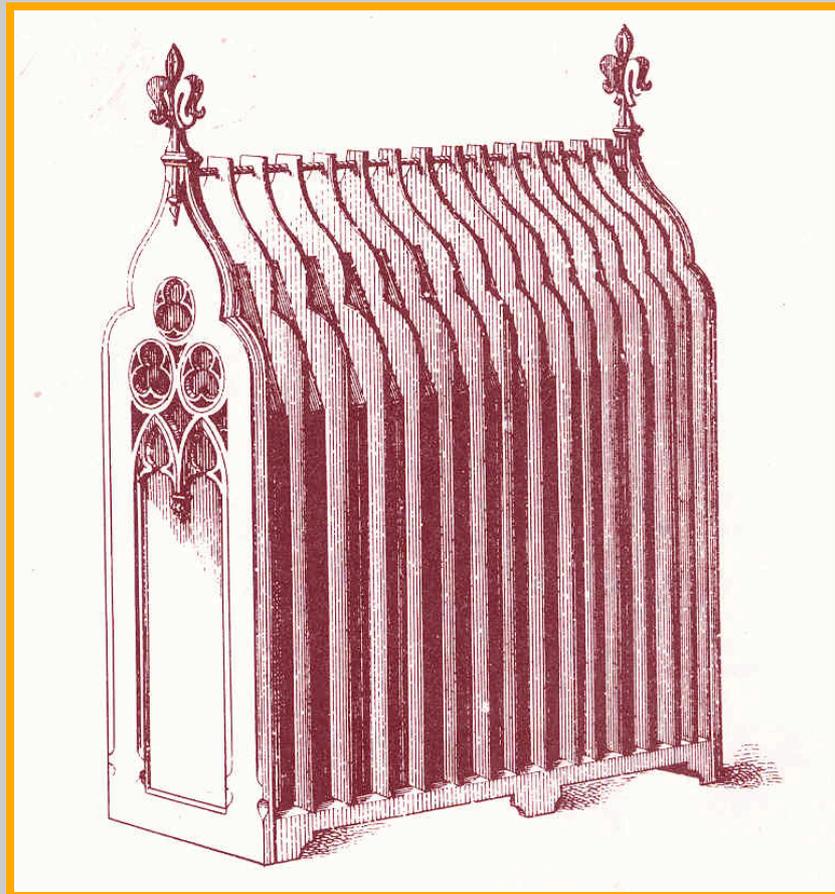
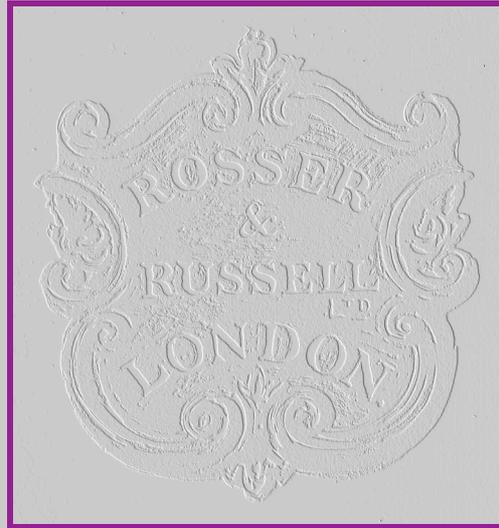
Rosser extended the range of the firm's work to include hydraulic and mechanical lifts and hoists, and the heating of conservatories and greenhouses. For Joseph Paxton's Victoria Regia (giant water lily) greenhouse at Chatsworth, built about 1850, (shortly before the death of John Sylvester) a Burbidge & Healy boiler supplied hot water to a series of cast-iron pipes around the external walls, and a Sylvester's Hot Air Furnace heated the cavities around the lily water tanks.

Later projects carried out by Rosser included St Paul's Church, Haggerston (Hackney) working with the architect Arthur Blomfield to provide "heating by hot air passing over a heated cockle" [*The Builder*, 1860/201]; the Royal Masonic Institution for Boys at Wood Green in Tottenham [*The Builder*, 1865/816-7] and The New Foreign Office & The India Office in Downing Street, working with the architects George Gilbert Scott and Matthew Digby Wyatt [*The Builder*, 1866/528].

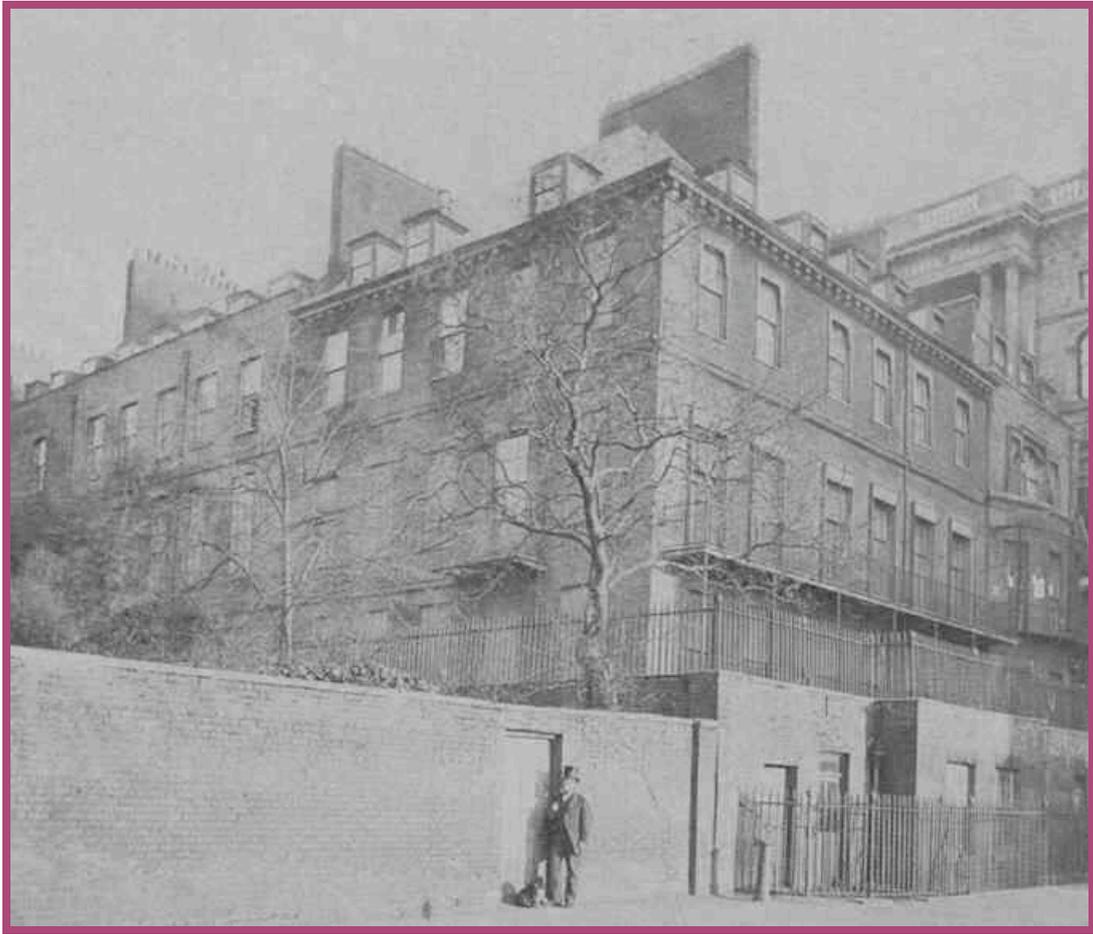
In 1866 Rosser took the young marine engineer, Joseph Russell, into partnership, forming the present firm of Rosser & Russell. In 1874 the firm took on the lease of Queen's Wharf on the River Thames at Hammersmith to be used as their works, the office remaining at Charing Cross. Samuel Rosser died in 1877.



The giant Lily House at Chatsworth



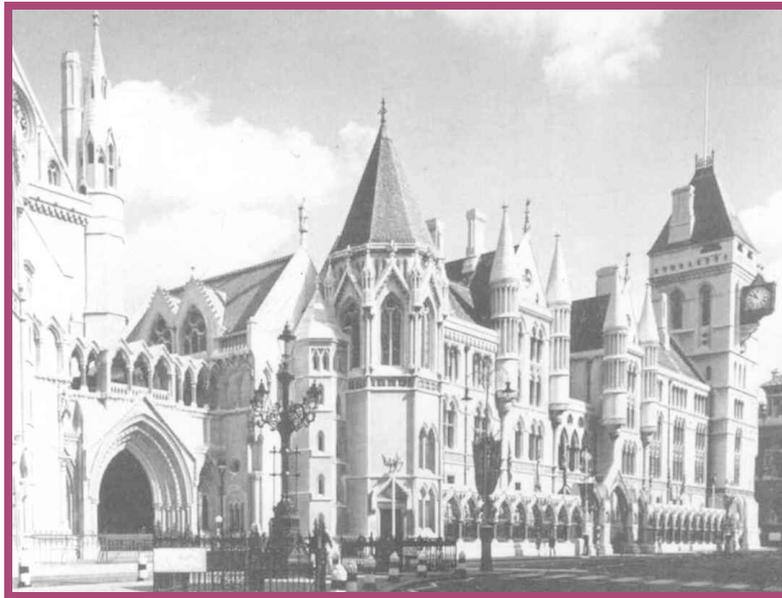
Rosser & Russell Gothic steam or hot water stove c.1867



*The New Foreign Office & The India Office, Downing Street, London.
“Hot water apparatus” by Rosser c.1866.
The building has now been demolished.*



*The New Colonial & Home Office, Parliament Street, London.
The architect was George Gilbert Scott.
Rosser & Russell was a supplier of heating apparatus.*



*The Law Courts in The Strand, London 1874-82.
Heating and ventilation by Rosser & Russell.*



*The National Safe Deposit Building, Queen Victoria Street, London.
Designed by John Whichcord, built 1871-73.
This photograph was taken shortly after completion.
A system of heating and ventilation was installed by Rosser & Russell,
as far as can be ascertained, in the early part of the 20th century*

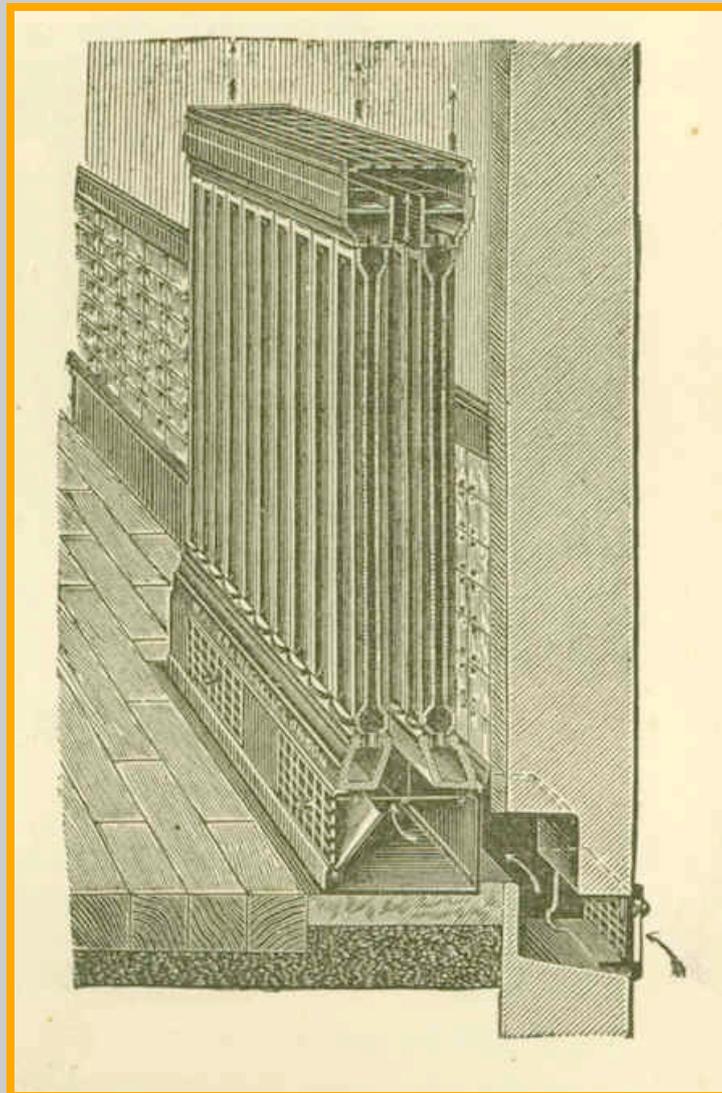
Joseph Russell 1834-1927

After a period as a marine engineer Joseph Russell entered into a business partnership with Samuel Rosser in 1866 to form Rosser & Russell. For 13 years after Rosser's death in 1877 Joseph Russell carried on leading the business singlehanded. Work undertaken during this period included heating for the Duke of Connaught's conservatory at Bagshot [*The Builder*, 1880ii/486], the New Colonial & Home Offices in Parliament Street [*The Builder*, 1874/524-5], Summers Place near Billingshurst in Sussex employing "the Rosser & Russell system" [*The Builder*, 1881i/374-6] and plumbing at The New Grange, Pirton in Herts [*The Builder*, 1880i/42-3]. When the Law Courts in the Strand (now the Royal Assize Courts) was designed by George Edmund Street and built (1874-82), Russell, having unsuccessfully lobbied the First Commissioner, still managed to obtain the contract for heating and ventilating for the sum of £22,000. In 1884 Royal recognition came the firm's way and it was able to describe itself as "horticultural Builders and Warming Engineers by Appointment to Her Majesty the Queen, HRH the Duke of Connaught, and HRH the Duke of Teck."

The Company was incorporated in 1890. Joseph then had the support of the new Board, which consisted of his son Nelson, his son-in-law John Alfred Naylor and J S Rosser (son of Samuel). When the Company was formed Joseph stipulated that he should be a life Director and Chairman until his death or resignation. This he fulfilled until his death in 1927.



Bagshot Park, Surrey, where Rosser & Russell installed underfloor heating in the conservatory for the Duke of Connaught, the architect being Benjamin Ferrey, c.1880. The house is now the home of HRH Prince Edward Earl of Wessex & The Countess of Wessex.



*From the catalogue of Rosser & Russell
22 Charing Cross, London, textbook of 1891.*

“another form of ventilating radiator with an ingenious arrangement to regulate the fresh air inlet at the base, so that either the inflow of air from the outside can be acted upon, or this can be stopped and a valve or flap in front of the base opened for the air of the apartment to be warmed only. This is of convenience when the room is to be heated quickly, or when the occupants are very few and ventilation by special means is of less importance. This pattern radiator is also made without the ventilating arrangement, in plain and inexpensive form, also in pedestal and other shapes.”

J Nelson Russell President IHVE 1902



J Nelson Russell, Joseph's eldest son, was appointed to the Board of Rosser & Russell in 1890. The notes of E N Russell refer to a memorandum of December 1890 dealing with an agreement between Joseph Russell (his grandfather) and his partner George Caulfield. The capital of the Company was £25,000 divided into 5,000 shares of £5 each. The objects of the Company were to carry on the business of:

- “1. Heating and Ventilating and General Engineers.
2. Smiths, Millwrights and Iron and Brass Founders.
3. Iron and Wood Steam Boat Builders, Conservatory and Hot House Builders.
4. Iron and Wood House Builders in all its various branches.”

Nelson was brought up in the nearby family home, Digby House, with his two sisters named Louise and Rebecca (Daisy), later Mrs Naylor and Mrs Wallace. He was a founder member of the Institution of Heating & Ventilating Engineers in 1897. The membership list for 1899 records him as living at 8 St Mary's Grove, Gunnersbury. Nelson served as President in 1902. His Summer Meeting was held in Birmingham, but there is no record of him having given a Presidential Address. However, he wrote two papers for the IHVE: *Low-pressure hot water heating systems* in 1900 and *Determination of Heating Surface* in 1904. He was awarded the IHVE Silver Medal in 1904.

Nelson was also on the provisional committee of the National Association of Master Heating & Domestic Engineers (now HVCA) when it was formed in 1904. Rosser & Russell was a founding member company. He joined the American Society of Heating & Ventilating Engineers (now ASHRAE) in 1899 and in 1934 was profiled in the *ASHVE Journal* as one of the ten then-current members holding the longest terms of membership in their respective countries.

Upon the death of his father in 1927, Nelson Russell became Managing Director. He continued as a Director of the Company until his death in 1948.

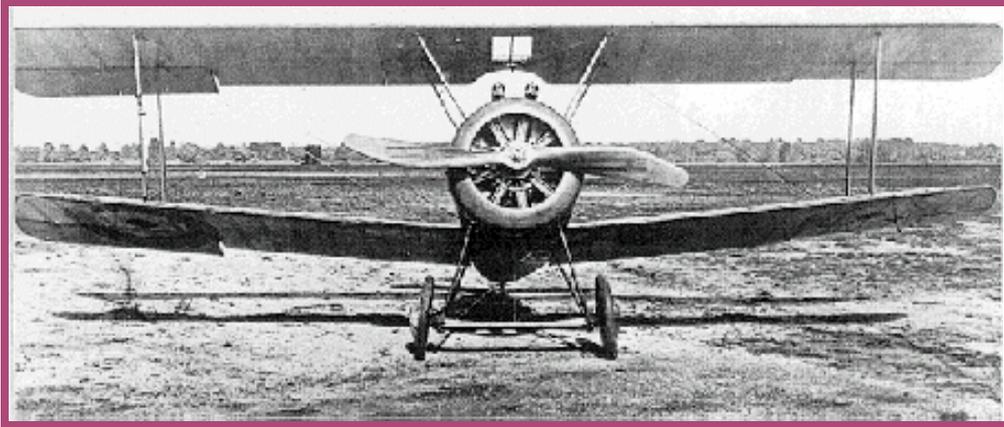


*Queens Wharf, Hammersmith.
The Rosser & Russell premises are on the right.
The photograph is later than 1882, the date when St Paul's Church,
in the distance, was built.*



*Queen's Wharf, Hammersmith.
Rosser & Russell premises are right of centre, possibly photographed in the 1920s.
The upper signboard reads "Rosser & Russell Ltd".
The lower sign is largely indecipherable but the words
"Heating" and "Engineers" can just be made out.*

First World War 1914-18



As part of the war effort Rosser & Russell made room at their works for the Romanian engineer George Constantinesco who developed an interrupter gear that enabled the machine guns of a fighter plane to fire forward through the propeller without hitting the blades. Pictured is a Sopwith Camel with twin Constantinesco Fire Control (CC) Gear.



One of Rosser & Russell's wartime products was the Y-gun, a silent depth-charge thrower, the first half dozen prototypes of which were supplied to the Admiralty from the Queen's Wharf works.



*Rosser & Russell carried out work for Carlo Gatti in the 1920s.
The photograph is a turn-of-the-century horse drawn ice delivery cart of the
United Carlo Gatti, Stevenson & Slaters Company, London's biggest distributor.*



*GEC Osram filament lamp & box, c.1926
Rosser & Russell provided piping services at the factory: "vacuum pipe lines
for the exhaustion of air, and lines to carry inert gases for electric light bulbs."*

Working in the Office

As told by Edgar Russell:

“I do not remember any London Office prior to the one at 22 Charing Cross.....when I went there to see the funeral procession of King Edward VII in 1910. (About 1916) my father took me to 22 Charing Cross to help with office boy duties.

I worked in a dingy and dirty basement room, the only natural light being from pavement lights so that artificial light had to be used continuously. This was poor probably because carbon filament electric bulbs were still in use. There was a telephone switchboard, which nonplussed me, and a letter copier, which obtained a very faint blurred copy of letters, sent out. It was not electric or photographic and the copy was obtained by damping the flimsy paper and pressing it onto the original. The result was a ‘looking-glassed’ copy, which had to be looked at through the back to read it. Carbon paper was only just starting to arrive on the market. General correspondence was in long hand except for letters to clients, which were typewritten.

The total staff in those days was about nine and they dealt with the heating and ventilating side of the business. My father and uncles also kept an eye on the mechanical work done at the Wharf.”

War jobs included contracts at Ellesmere Port in Cheshire (a large shell filling factory), the Beldam Factory in Brentford (manufacture of rubber vehicle tyres), the Royal Flying Corp Stores at Ruislip (2 coal-fired Lancashire steam boilers) and the Handley Page Aircraft Factory at Cricklewood (12 Ideal hand-fired sectional boilers).

Contracts in the 1920s included The Stock Exchange, Parnell’s Store at Victoria, the Daimler Hire Company in Knightsbridge and the Midland Bank at Uxbridge.

Edgar Russell also served part of his apprenticeship working at the Leed’s office of Rosser & Russell, situated near the centre at 21 Aire Street. The Manager and Director in charge was H C Hayes, who was at the time the only non-member of the Russell family on the Board. There was also a small store at Hull. One contract was for steam heating by overhead pipes at the Montague Burton Clothing Factory in Leeds.

Later (around 1923), the Rosser & Russell London office moved to 37 Duke Street, close to Selfridges.

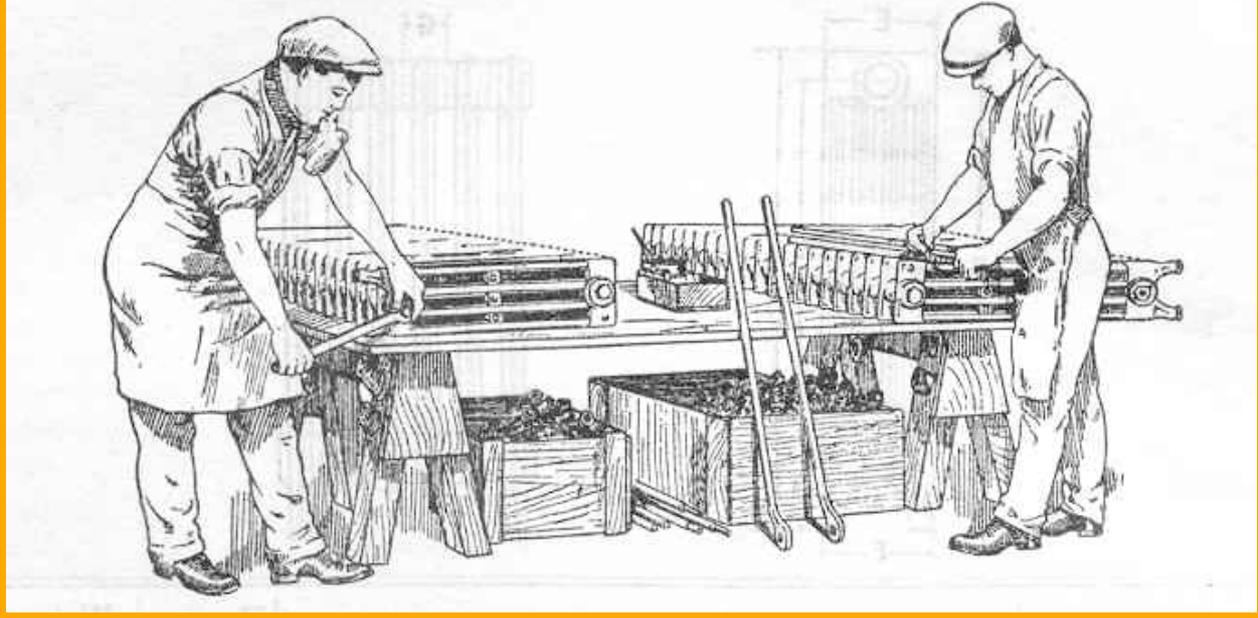
Edgar Russell recalls that calculations and estimates were crude. Heat losses calculations were carried out using a series of rule-of-thumb factors. Calculations for gravity pipe sizing “were a bit more hazardous” and relied on a pipe sizing chart, commonsense and experience. Typical labour rates ranged from 2.5d (old pence) per foot run of half inch pipe to 10d for 3 inch size, these figures covering cutting, screwing and bending of pipework and the fixing of pipe and fittings.

“The rate for fixing a cast iron radiator and its valves and supports varied between ten and seventeen and a half shillings depending on radiator size. When wages increased a percentage was added to the final labour figure. A labour figure used to be given to the fitter in charge and if he saved on it he received 50% of the saving. If he exceeded it the firm bore the brunt.

The amount added to prime cost was between 20% and 25% for overheads and profit. This could vary downwards when work was short and upward when it was more abundant. The prime cost was the actual cost of materials, labour and workmen’s lodging and travelling allowances.

Estimating, however, was on liberal lines so that the final percentage on completed work was often more than 25%.”

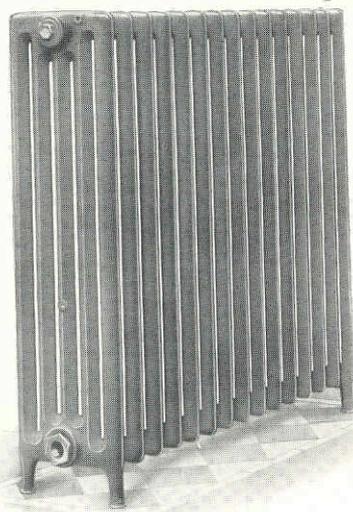
Assembling of Radiator Sections



National Radiator Company (Ideal Manual, Hull 1930)

BEESTON ROYAL RADIATOR.

FIVE COLUMN, 9½ IN. WIDE.



Catalogue Beeston Boiler Company, Notts 1932