Heating Engineers

Many early firms styled themselves as heating engineers. Many were manufacturers. Some of these were also installers. A few firms were ventilation engineers. Arguments still rage as to the earliest pioneers, this judgement being clouded by the fact that a number of firms were engaged in other forms of business, usually related to metal working, before they were involved in heating work. Various claims were aired in *The Ironmonger* in 1928, and it was concluded that the oldest heating firm of installers was Edward Deane & Beal of London, founded in 1700, though they were probably not heating engineers at this time.

Comyn Ching of London first traded as ironmongers, possibly as far back as 1688, but a more realistic date for trading as heating contractors appears to be from the 1850s. Rosser & Russell, London, took over the business of Charles Sylvester, who had been involved in heating since the 1790s, but set up his heating firm around 1820. The company became S E Rosser in 1856 and Rosser & Russell in 1866. Abraham Seward & Co started as tinplate workers in 1778 and appears to have engaged in heating from 1808. Clement, Jeakes & Co of London may have had their origins before 1800, having amalgamated in the 1890s. Certainly, Jeakes was active in heating around 1860. The firm was later taken over by Benham & Sons; Mr John Lee Benham having been engaged in heating work as far back as 1847.

G N Haden (originally G & J Haden) started in Trowbridge in 1816 as agents for Boulton & Watt steam engines. Within ten years they were carrying out heating work, their steam experience standing them in good stead. J C & S C Ellis of Sheffield is recorded as carrying out heating installations in 1825. They were later taken over by Brighton Foundry.

Other well-known early heating contractors include Ashwell & Nesbit of Leicester (1879), Z B Berry & Sons of London (gasfitters in 1810, seemingly heating engineers from the 1870s), James Boyd & Sons of Paisley (1826 origins), Richard Crittall of London (1884), Matthew Hall of London (founded as plumbers in 1848), Arthur Scull of Bristol (founded as plumbers in 1881), and William Truswell & Sons of Newcastle on Tyne (1870 Installations carrying nameplates of any of these contractors may be of historical importance.)
Early heating firms, generally not so well-known, include John L Bacon of London (active 1870s), W G Cannon of London (1880s), Feetham & Co, London (1825 origins), J S Garland, London (1820s), Garnon & King of Exeter (ironmongers in 1661, heating engineers from about 1840), Herring & Son of Chertsey (active 1876), Mr May of London (active 1857), Jones & Attwood, Stourbridge (1836 origins, in heating from 1860s), Henry Warner of Ipswich (trading as a whitesmith in 1845), J Wotton-Smith & Gray, London (founded 1835, started by installing electric bells and speaking tubes), and Skinner, Board & Co, Bristol (also traded as Vincent Skinner, 1880s). Some of their installations still exist.

The early heating industry largely began in horticultural circles by providing warming in tropical glasshouses and the like. Glasshouses became very popular in Victorian times. Their builders often took the responsibility for installing (and sometimes manufacturing) the necessary heating apparatus. Firms undertaking this work included W & D Baily of London (active 1817), James Crispin, Bristol (1890s), W & S Beards, Harlow, Essex (1880s), Fletcher, Lowndes & Co, London (1880s), Chas Frazer of Norwich (being run by his Executors in 1894), Gough & Felgate, Burton-on-Trent (1890s), A P Jevon, Birmingham (1880s), Mackenzie & Moncur, Edinburgh (believed to have started as horticultural builders c. 1815, was carrying out heating in the 1860s), Messenger & Co, Loughborough (horticultural works in 1858), and Henry Ormson of Chelsea (active 1880, "By Royal Appointment"). Rosser & Russell, London, also held the Royal Warrant (granted in 1884) as "Horticultural Builders and Warming Engineers."

The heating installers organized in 1904 with the founding of the Heating & Ventilating Contractors Association (originally called the National Association of Heating, Ventilating and Domestic Engineering Employers). There were 20 founding members; today there are some 1300.
Assisted Ventilation

The term “ventilator” was used in 1735 to describe the man employed to turn the crank handle which operated the Fanning Wheel of Dr Desaguliers, used in the House of Commons. Bellows were used by Sir Martin Tricwald for ventilating ships (1741) and by the Rev Stephen Hales to ventilate a hospital (1758) and a prison. The architect Barry used a steam jet (ejector pump) for the ventilation of the House of Lords (c.1847). Meanwhile, Arnott used an automatic air pump for nighttime ventilation of York hospital; it was driven by water, pumped into high-level storage during the day.

Using heat as the motive power for ventilation can be traced back the mines of Saxony in the 16th century. The use of fire-assisted ventilation (using the principle that heated air rises) first appears to have been applied to buildings by Desaguliers who used it for the House of Commons in 1723. It failed because the housekeeper refused to keep the fires alight; hence the later installation of a Fanning Wheel.

Major Joshua Jebb used fire-assisted ventilation in 1844 for Pentonville Prison. When the House of Commons was rebuilt after the fire of 1834, it was the Scottish chemist, Dr David Boswell Reid, who was entrusted with the design of a fire-assisted ventilation scheme. This was never satisfactory, partly due to the never-ending arguments between Reid the engineer and Barry the architect. (However, Reid’s design for the heating and ventilating of St George’s Hall, Liverpool in 1851, where he used steam-driven fans, was eminently successful).

An impassioned advocate of natural ventilation was Robert Boyle Jr, who carried on the mid-19th century business of his father, Robert Boyle Sr, and published numerous leaflets, books and catalogues around 1900. Father and son extolled the merits of natural ventilation and shunned mechanical methods. Their company, Robert Boyle & Son, manufactured a wide variety of apparatus and fittings for natural ventilation, including a patented Air Pump which relied on wind effect. Their catalogues list an amazing variety of inlet and outlet grilles and tubes, duct fittings, self-acting and regulating air valves, brackets and panels. Boyle equipment was used in hundreds of buildings, and many examples can still be found.
Ornamental ventilation air inlets. The Boyle System of Ventilation.
Robert Boyle & Sons, London & Glasgow, c.1900
Natural ventilation of a theatre, Robert Boyle & Son, London & Glasgow, c.1900
"Being aware, from personal experience, of the bad state of the atmosphere which used to prevail on Court days, we are in a position to say that a marked improvement has been effected—so decided a change for the better, in fact, that we can quite endorse the favourable opinion of it which has been given by Sir John Monckton, the Town Clerk."—Buddler.

**The "Boyle" System of Ventilation**

As applied to The Council Chamber, Guildhall, London.

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Natural ventilation of the Council Chamber, Guildhall, London, Robert Boyle & Son Ltd, London & Glasgow, c.1900
Boyle Air Inlet Tubes, c. 1900

Acme & Spherical Ventilators, Smoke Cures, and High Pressure Heating.

No. 29 E.—Electric and other Fans for every purpose.

Spherical Ventilators.

No. 27.—This design in double the prime given for Nos. 79 and 78.

Fig. 1.—Acme Louvres in Fins, which Rafters, for Derrars, Walls, &c.

Section of Acme Patent Harrow Railways Louvres. The arrows show the Motion of the wind and exhaust.

3d Years' Experience.

Acme Ventilating & Heating Co., LIVERPOOL.

Apply for fuller particulars.


Acme Warming Apparatus, showing Furnace in Basement with cell of plynas and ornamental, case in entrance hall, etc. Neatest and most efficient high pressure system.

No. 24.—Tonnelle Crepe Wall Inlet, 2 in., 2 1/2 in. No. 90, 12 in. by 2 in., 15 1/2 in. by 4 1/2 in., 12 in. by 6 1/2 in., 9 in. by 9 in., 12 in. by 12 in., 6 in. Add these three more air than ordinary perforated Althas. Walls keep perfectly dry. Superficel main. Tapered used in Smoke Stacks.

No. 32.—Acme Terra Cotta (wall Chimney) and other smoke curces.
Screw fan, strap-driven from a steam engine, Useful Hints on Ventilation, W Walker, Manchester, 1850
Centrifugal fan driven by double enclosed steam engine,
Fans & Mechanical Ventilation

The first recorded use of ventilating fans is probably that shown in a series of woodcuts and described by Georgius Agricola in his book of 1556, *De Re Metallica*, on German mines. Motive power by provided by human or horse power, windmills and watermills. The early part of the 19th century in Britain was largely concerned with the development and manufacture of large fans for mine ventilation.

The first significant fans in the United States were those designed by Nason & Briggs for Washington’s Capitol in 1857. Bennett Hotchkiss of New Haven patented the first true multiblade centrifugal fan in 1863. The major and most important manufacturer of centrifugal fans from about 1860 was undoubtedly Benjamin Franklin Sturtevant of Boston. He opened a London office in the 1890s. The majority of these fans were driven by steam engines since large reliable electric motors and power supplies were not widely available in late Victorian times.

In continental Europe, considerable efforts went into fan development from the 1830s, in which France, and later Germany, played leading roles. In Britain, scroll casings had been described by Dr Ure (1844) and by Reid about the same time. Professor Rankine designed a fan with a spiral casing (1857). Early fan designs and patents include those by Charles Barlow of London (1878), Henry Aland of Wandsworth, London (1883), George Greig of Kincardineshire, Scotland and the most famous of them all, the Sirocco of Samuel Cleland Davidson, Belfast (1898). The James Keith & Blackman Co of London also developed an important centrifugal fan in the early 1900s, but fought a series of court cases with Davidson over the validity of the Sirocco patent. With the widespread availability of electric motors in the 1920s, mechanical ventilation became increasingly common in industrial, commercial and institutional buildings.
A number of British firms were manufacturing fans when the IHVE was founded in 1897. Some of the better-known ones included the Blackman Ventilating Co, London (later Keith Blackman), James Howorth & Co at Victoria Works, near Bolton (describing themselves as inventors, patentees & sole manufacturers of their patent revolving Archimedean, Radial & Horizontal Screw ventilators & air propellers), James Stott of Manchester, B Verity & Sons of Birmingham, The Waddle Patent Fan & Engineering Co of Llanelli (first made a colliery fan in 1864), and Walker Bros of Wigan (active before 1850) and Musgrave of Belfast (made fans from the 1890s). The company that became one of the best-known makers of fans for heating and ventilating work was Matthews & Yates, Cyclone Works, Swinton, near Manchester; their main known range of fans was the Cyclone. Later, notable British fan manufacturers were Aldays & Onions of Birmingham, Andrew Machine Co of Stockport and Standard & Po chin of Leicester. Fans made prior to 1940 have been found at a number of heritage sites.

The years after the Second World War saw the development of the axial-flow fan. Early makers included Aerex, Airscrew, and Keith Blackman, but it was Woods of Colchester that in 1947 introduced the first standardized range on a batch production basis. In 1951, the first edition of “Wood’s Practical Guide to Fan Engineering” was published and it quickly became a standard textbook on the subject.
Ventilation of the Mersey Road Tunnel connecting Liverpool and Birkenhead, 1934

*Walker fan impeller, about twice the Sturtevant diameter*

*Sturtevant fan, 174,000 ft³/min*

*Walker fan, 900,000 ft³/min at 7 inches water gauge*

*Two Sturtevant fans*
E W Stevens, Taunton, Heating Engineer

Crispin, Bristol

A H Skinner & Co, Heating Engineers, Stokes Croft, Bristol

Paragon No.1 [stove]

The London Warming & Ventilating Co, [Gurney stove]

Mitchell's Patent Reverberating Smoke
Nameplates

It may seem obvious that looking for nameplates in plant rooms or on equipment is an essential step in determining the manufacturer or installer of heating and ventilating apparatus or systems in buildings of probable historic engineering interest. However, it should be borne in mind that examining a building of historic value is no guarantee that its engineering will be of interest. In fact, historic items of engineering may sometimes be found in undistinguished buildings.

Makers’ names may be found on stoves, boilers, radiators, fans, pumps, oil burners, electric motors, steam engines and controls. A pattern or model name may be included, or in the case of a stove or radiator may be the only marking.

In Victorian times, the installer often left his mark in inconspicuous places. Examples include on water feed & expansion tanks, valve bodies, cast-iron plaques, floor tiles, fan plates, gauge boards, and even as labels fixed to the ends of radiators.
FURTHER READING

Some modern information sources


1997. The Quest for Comfort, Brian Roberts, privately published for the CIBSE Centenary (a selective pictorial history of all building engineering services).


Victorian and Edwardian references


1891. A Practical Treatise upon Warming Buildings by Hot Water, Chas Hood, rewritten by Fredk Dye, 1891, E & F N Spon, London

1904. Heating by Hot Water Walter Jones, Crosby Lockwood & Son, London


Cover Illustrations

Front Garney stone, Tewkesbury Abbey c.1880

Inside front Anderson & Bolton's patent steam superheater, A Anderton & Sons, Accrington, c.1900

Inside back Perkins high pressure hot water boiler, Royal High School, Edinburgh, c.1900

Back Steel plate centrifugal fan with three-quarter housing on brick chamber, Central Methodist Hall, London 1911

Additional information is available on the website of the CIBSE Heritage Group at www.hevac-heritage.org
Perkin’s high pressure hot water boiler, Royal High School, Edinburgh, c.1900
Steel plate centrifugal fan with three-quarter housing on brick chamber,
Central Methodist Hall, London, 1911