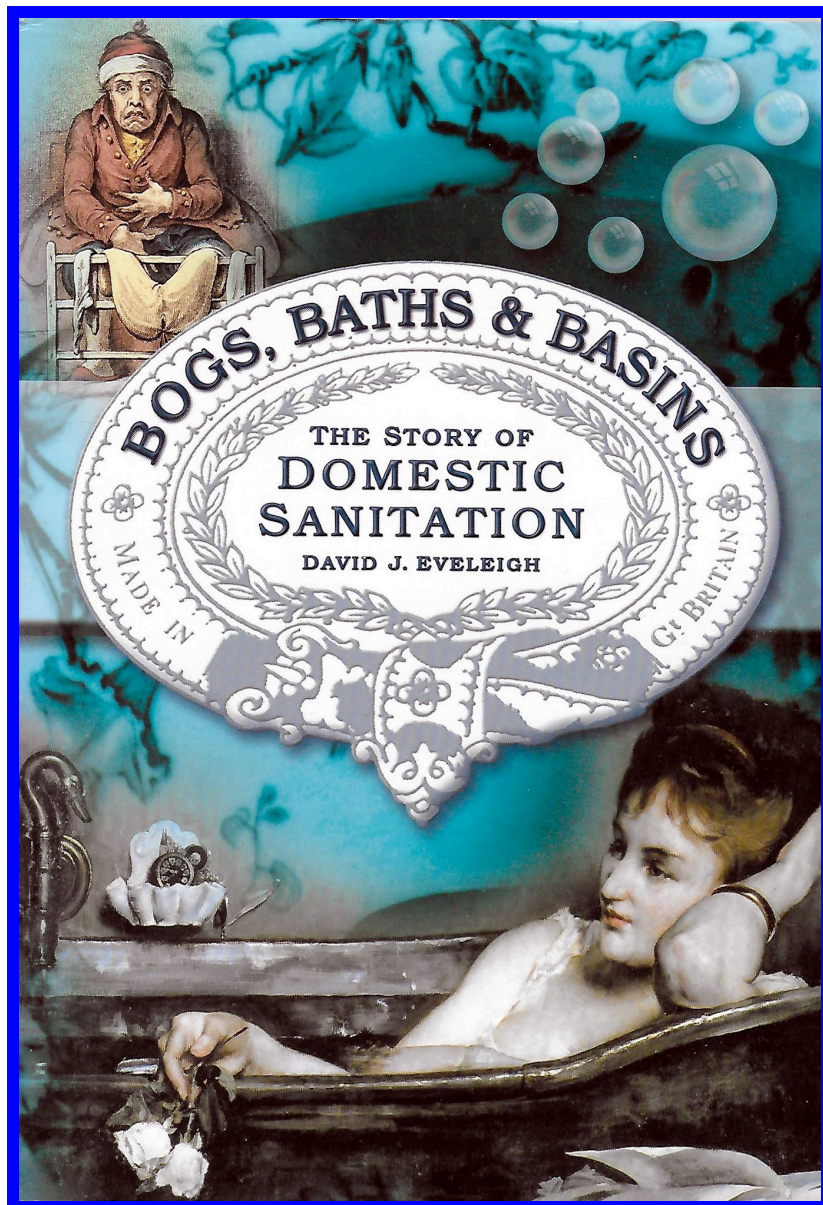


PLUMBING & SANITATION
FROM EARLIEST TIMES

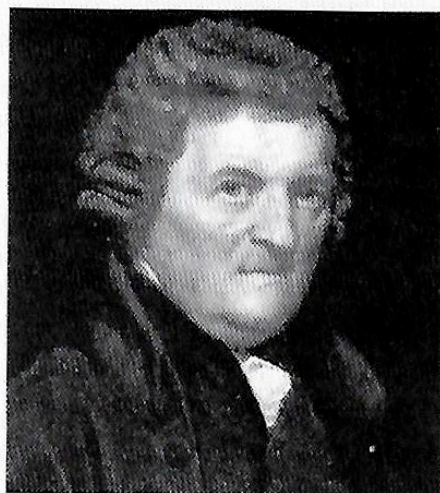
Pioneers



2002

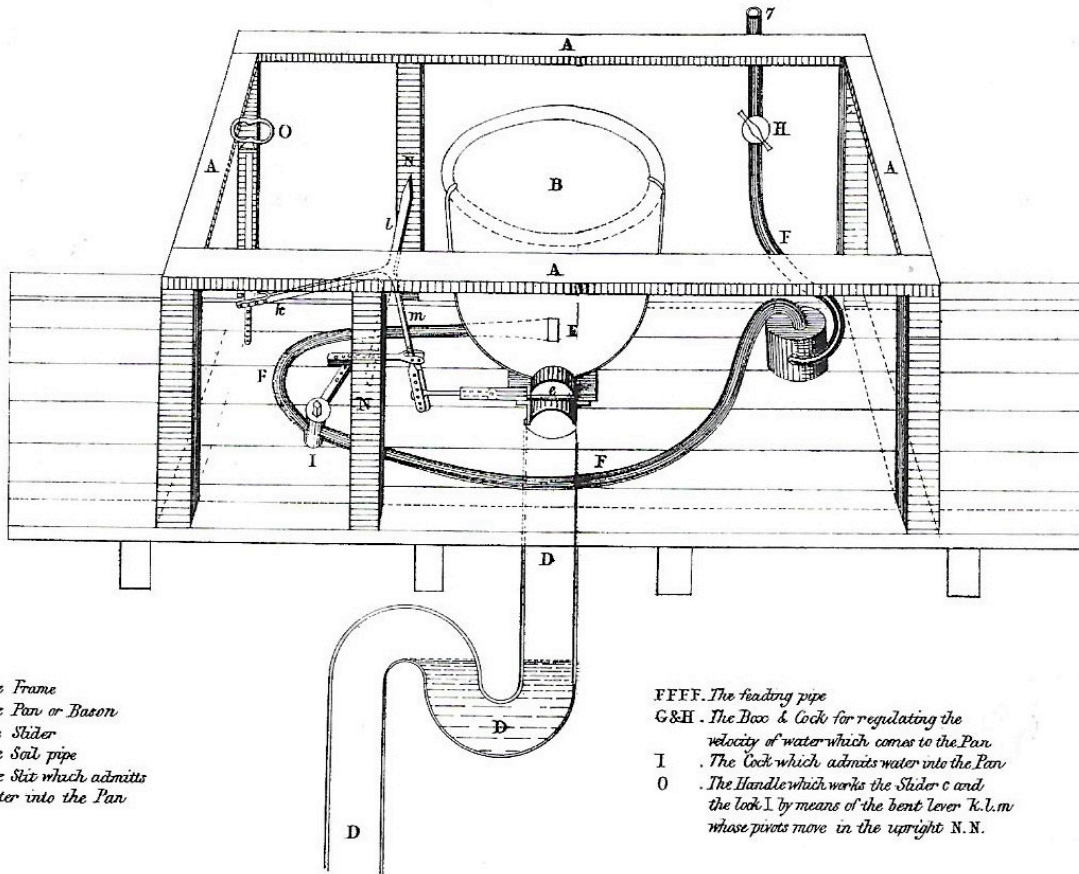
Alexander Cummings (c. 1732–1814)

ALEXANDER CUMMINGS is believed to have been born in Edinburgh in about 1732. In the second half of the eighteenth century he was a leading London clock and watchmaker and was elected an honorary freeman of the Clockmaker's Company in 1781. The Clockmaker's Library has a folio volume containing memoranda, descriptions, observations and correspondence collected by Cummings between 1766 and 1812. This provides some idea of the wide range of his interests in mechanical and scientific matters including barometrics, hydraulics and centrifugal force. He is credited with the invention of a clock escapement and made a barometric recording clock for George III. In 1766 he wrote *The Elements of Clock and Watch Work* and also assisted the Board of Longitude in laying down the conditions for the testing of Harrison's fourth marine chronometer. At the time of his 1775 patent for water closets he was working at 'The Dial and Three Crowns' in New Bond Street. He died at Pentonville in 1814.



Alexander Cummings. (*The Worshipful Company of Clockmakers*)

Fourteen years after the initial building of Osterly House, Alexander Cummings, (c. 1732–1814) the Bond Street watchmaker and leading horologist, was granted a royal patent for his improved water closet. Several important innovations were incorporated in his design and one in particular provided further illustration that water closets must have been familiar in London by this time. 'The stink trap hitherto used for water closets,' wrote Cummings in his patent specification, 'is too well known to require a description here.' Without a seal sewer gases could enter a room through the closet, so it was essential that a water-sealed trap was fitted below the device. This had been imperfectly understood by Wood in Bath in 1728, but the use of traps must have spread by the 1770s, and the type which Cummings was all too aware of was almost certainly the so-called D trap. This trap was widely used as it was a straightforward matter for a plumber to make one from pieces of sheet lead soldered together. While it cut off the foul smells from the drain, the D trap unfortunately generated its own, as the water it contained was not completely replaced by the flush water. It was not, in other words, self-cleaning. As Cummings pointed out, 'it becomes in itself a magazine of foetid matter, which emits an offensive smell every time that it is disturbed by using the water closet'. Instead, he specified a trap which was 'recurved' about 12 or 18 in below the pan so that it held sufficient 'stagnated water' to cut off all smells from below and which, 'is totally emptied and succeeded by fresh [water] every time the pan or bason is emptied'.



AAAA The Frame
 B The Pan or Bason
 C The Slider
 D D D The Soil pipe
 E The Slit which admits
 water into the Pan

FFFF The feeding pipe
 G&H The Box & Cock for regulating the
 velocity of water which comes to the Pan
 I The Cock which admits water into the Pan
 O The Handle which works the Slider c and
 the lock I, by means of the bent lever k, l, m
 whose pivots move in the upright N, N.

The introduction of the water-sealed trap – popularly known as the U bend – was, in itself, an important development, but Cummings also introduced other improvements to the water closet. The seal to the soil pipe was further protected by an outlet valve at the bottom of the pan. This was operated by a handle and angled lever: when the handle was pulled up the lever drew the valve or ‘slider’ to one side. Simultaneously, the cock or inlet valve which released the flush water was opened by a lever working off the main one controlling the sliding valve. This simultaneous action of the inlet and outlet valves was to remain a basic feature of all valve closets until their demise in the early twentieth century. Cummings made the pan circular with the deepest part under the middle of the seat to ensure that the ‘soil’ – to use the patentee’s own word – would be deposited near the outlet and submerged in the water held in the bottom of the pan by a sliding valve. The flush water, instead of pouring into the pan from a pipe or spout just below the seat, entered through a rectangular slit placed just 4 or 5 in above the outlet. As Cummings explained, ‘The water entering the pan or bason through this slit with rapidity is circulated and accumulated within it, so as to wash or cleanse it.’¹⁰

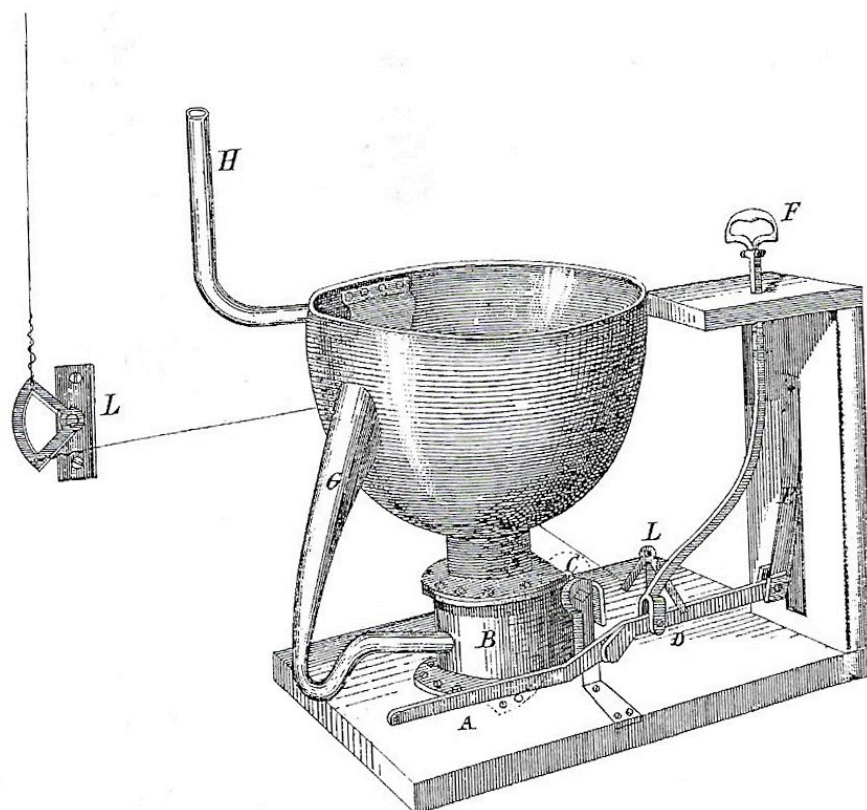
Cummings’s water closet from his patent specification of 1775. The sliding valve can be seen at the bottom of the pan connected to the closet handle by an angled lever.

Cummings's water closet represented a major advance in their design, and yet its shortcomings have tended to overshadow his achievement. The main problem was the sliding valve: when it was opened, this vital component was not exposed to the cleansing action of the flush and when it returned to the shut position it remained soiled from the previous use. Over time, the valve acquired a coating of encrusted dirt; it was also prone to rust and so became increasingly difficult to move. This defect came to the attention of a young tradesman from Yorkshire, Joseph Bramah (1748–1815), who had moved to London to find work in 1773. Working as a joiner and cabinet maker for a Mr Allen, who, apparently had made his own modifications to Cummings's design, Bramah became acquainted with water closets, fitting the wooden enclosures and seats.¹¹ In May 1778, describing himself as a cabinet maker of Cross Court, Carnaby Market, he took out a patent for a water closet with two valves, 'so situated and constructed as totally to prevent the great inconveniences complained of in every sort of water closets heretofore made use of'.¹² Bramah replaced Cummings's 'slider' with a flap valve: this dropped down when the handle was pulled so that it was, in his own words, 'thoroughly washed every time the contents of the basin are discharged'. Bramah also moved the inlet valve from its customary position at the end of the feed pipe, near the closet bowl or pan, to high up in the cistern. He had obviously encountered many instances of the water in the feed pipe and the inlet valve freezing in cold weather. Perhaps the problem had been particularly acute during the winter of 1776 when Parson Woodforde encountered snow drifts in Oxford and in Selbourne, Hampshire, Gilbert White wrote of fierce frosts which froze the contents of chamber pots under beds.¹³ With Bramah's modification there was now less likelihood of the feed pipe or valve freezing. The feed pipe was now below the valve and so was drained of water after every use. Bramah also placed the valve mechanism above the water level in the cistern so it could not be frozen in ice.

Bramah had devised an extremely effective water closet. The basin contained a good depth of water in which solids were completely submerged and liquids diluted; it had a large exposed surface of water reducing to a minimum the possibility of fouling the basin and practically silent action. His cranking arrangement, which operated the two valves, was also more effective than Cummings's design. The main lever, one end of which was raised by pulling the flushing handle, was held against a wooden board by a spring. This ensured that when the handle was released it sprung back into position and also that the flap valve was held tight against the bottom of the pan. The mechanism included a shorter lever working

*'Fierce frost: ice under
people's beds & cutting
winds.'*

Gilbert White,
28 January 1776.



Bramah's valve closet from his patent specification of 1777. Flush water entered the closet from the pipe (H), behind a fan riveted to the pan. The waste left through the lead valve box (B). The diagram shows the closet handle (F), connected to the main lever (D), which was sprung against the vertical board and connected to a small crank (C), which operated the outlet valve. The pipe (G) is the overflow and is bent to contain a water seal from the valve box. Part of the system of wires and cranks operating the inlet valve in the cistern is seen on the left.

off the main lever so the water supply valve operated simultaneously. By the early nineteenth century, water closets controlled by a sprung lever like Bramah's, were being called 'spring valve closets'.

In place of a spring, many nineteenth-century Bramah-type closets used cast-iron counterweights attached to the end of the two levers: these also ensured the discharge valve snapped shut in a businesslike way. Bramah's outlet valve rotated – or flapped – within an iron valve box on which the pan or basin rested. The valve box was provided with its own ventilation and was also connected to an overflow pipe from the pan above: this overflow was made with a reverse curve to create a water-seal trap to prevent bad air from escaping from the apparatus. A short distance below the valve box was another seal – a water-seal trap – which provided a second barrier between the closet pan and the soil pipe. Bramah said nothing of this in his patent, and illustrations of valve closets as late as the 1850s suggest that they were usually fitted with the inefficient D trap. The trap was usually located under the floorboards and was, therefore, virtually impossible to get at for maintenance or cleaning, but the cranking mechanism, valve box and pan were enclosed in a wooden cabinet, usually of mahogany. The top contained the seat with its round hole above the pan and a smaller one at the side fitted with the cup and pull handle.

Joseph Bramah (1749–1814)

JOSEPH BRAMAH was the son of a farmer from Stainborough, near Barnsley, Yorkshire. He served an apprenticeship with the village carpenter, but in 1773 decided to seek work in London. He made the journey on foot and secured work as a journeyman cabinet maker working for a Mr Allen of Cross Court, Carnaby Market. While recovering from a serious fall at work he turned his attention to improving on Cunmings' valve closet, and in 1778 patented his own improved design – only the third to be taken out for a water closet. This was his first patent and he soon set up business on his own as a cabinet maker in the less than salubrious Denmark Street in the parish of St Giles. Bramah's valve closets were a commercial success. He could probably have established fame and success on this invention alone, but this remarkably talented and inventive man went on to take out another seventeen patents covering improvements to water cocks, locks, fire engines, carriage brakes and suspension, printing presses and even fountain pens. He also invented the hydraulic press, without which many of the great engineering feats of the nineteenth century would have been impossible.

In 1783 he was elected a member of the Society of Arts, which brought him into contact with some of the leading engineers and manufacturers of the time. The following year he took out a patent for an entirely new type of lock that contained levers that could not be picked by the average picklock. Until the first patent by Chubb in 1818, Bramah had a virtual monopoly on high-class locks. In 1784 he also moved to more fashionable premises at the west end of Piccadilly. By 1785, when he took out a patent for a hydrostatical machine, he was describing himself as an engineer, and subsequently established works at Pimlico which included a foundry, machine or engineering shop, a pattern shop and a model or research room. He married Mary Lawton from near his family home in 1785 and had five children, three of whom adopted engineering as their career. The oldest, Timothy, had joined the family firm by 1813 when the name of the company changed from Bramah and Co. to Bramah and Sons, but in December 1814 Joseph Bramah died and was buried in Paddington churchyard. The firm continued in business until about 1890, by which time none of the family was involved.



Joseph Bramah. (*Institution of Mechanical Engineers*)

Joseph Bramah was one of those rare individuals who combined a practical and inventive mind with business acumen. Having somehow raised the £120 required to take out a patent he soon established his own premises in the heart of the fashionable West End at 124 Piccadilly. Bramah's closets were not cheap: in the 1780s and 1790s, his 'patent apparatus' cost 8 guineas but the total cost, including the cistern, valve and pipe-work came to over £11. Nevertheless, this was the first water closet to enjoy major commercial success. He soon attracted imitators, including a certain Hardcastle, who he took to court in 1789 for infringing his patent; witnesses vouched for the superiority of Bramah's device over previous ones and he won his case.¹⁴ He attracted custom nationwide. In 1787, he supplied one of his 'patent apparatus' to Soho House in Birmingham, the home of Mathew Boulton, the



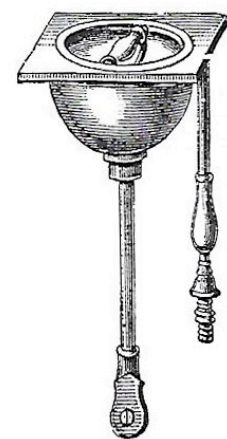
'Brisk Cathartic'. Early water closets were contained in a wooden enclosure and superficially resembled the primitive privy; however, the pull handle in the seat seen to the right of the user indicates that this is a water closet.

Attributed to Gillray, published by W. Humphrey, London, 28 January 1804.

(British Museum)


leading industrialist.¹⁵ Six years later, he was supplying another four to the country seat of Thomas Anson at Shugborough Hall, near Lichfield, Staffordshire.¹⁶ The owners of large country houses often equipped and furnished their homes from leading London suppliers, and situated in Piccadilly, Bramah was well placed to pick up provincial business. By 1797 he claimed to have sold 6,000 of his closets. Bramah's inventiveness and business flair quickly moved on to other areas – he made important improvements to locks and pioneered the hydraulic press – but his success as a manufacturer of water closets was secured. In the nineteenth century the Bramah became the accepted water closet among the well-to-do and his name a byword for the valve closet.

Bramah was not alone, however, in developing the water closet, and by 1800, seven patents had been taken out for water closets. In 1777, Lemuel Prosser, a London plumber, patented a closet with a



A closet handle for a pan closet, 1889. The handle, made of cut glass, ebony or china, was set in a brass cup recessed into the seat.

London 1794



Bought of J. Bramah,
 At his PATENT-ENGINE, LOCK & WATER-CLOSET
 Manufactory,
 West end of Piccadilly.
 Patent-Cocks for Brewers, Distillers &c.

By W. G. W. G. W. G.

June 16	1. Patent apparatus for water closets	32. 8/2
	8 ft 1 inch pipe & 2 joints to valves	19. 1/4
	1 Service Boxes w th covers of traps & branches	2. 1/6
	4 Air Traps w th 4 ft. 1/2. Gannell & 4 Joints	2 £ 1. 5
	120 ft. 1/2. pipe to pack D ^o w th	1. 15
	Pushing Buttons nails & Screws	8.
	Carriage & Toll to the use of Aldermanburg	7. 6
	Boothings, &c.	
July 19	1. Patent apparatus for water closets	12. 1/2
	11. ft. 1/2. pipe & 2 joints to valves	9. 1/2
	2 Service Boxes w th covers of traps & branches	1. 6
	2 Air Traps w th 2 ft. 1/2. Gannell & 2 Joints w th	2. 10
	2 extra Granks w th 1 lb. Brass copper wire	
	Particularly ordered	7. 6
	40 ft. 1/2. pipe to pack D ^o w th	5. 4
	Pushing Buttons nails & Screws	1
	Carriage & Toll to the use of Aldermanburg	5
		£ 111 1

A bill for six water closets or 'patent apparatus' from Joseph Bramah, water-closet manufacturer, Piccadilly, London, to Thomas Anson of Shugborough Hall, Staffordshire, 1793/4. The bill also lists the service boxes supplying the flush water, traps, valves and pipes. (Staffordshire Record Office)

plug set in a vertical tube. However, he submitted virtually no explanation in his patent other than vague and simple diagrams which suggest foul water would have circulated freely from the pan to the tube.¹⁷ Fortunately for posterity, the name 'Prosser' never became synonymous with the water closet. In 1796, William Law, a London iron founder, took out a patent for a self-acting closet where the flush was released upon the user rising from the seat. His patent featured a type of closet which was to become the chief rival of the Bramah closet in the nineteenth century.¹⁸ This was the pan closet, so named –

not after the upper bowl or pan – but after a metal pan that took the place of the outlet valve, holding water in the upper bowl and creating a seal. When the flushing handle was pulled the pan tipped the waste downwards. The pan closet was clearly in use before the mid-1790s. Law did not lay claim to its invention in his patent – just his self-acting device – and an example from Hampton Court, which is believed to date from about 1780, survives intact, albeit somewhat battered and incomplete in the Science Museum, London.¹⁹

This sudden flurry of patents for water closets from the 1770s occurred at a time when material standards of living were rapidly improving. In short, people were becoming more civilised: contemporaries noticed the difference between England in the 1740s and the 1780s. Expectations of comfort in the home – at least, for the better-off – were rising and they were met by new manufacturers producing a wider range of consumer goods – from fine earthenware and carpets to cast-iron grates and ovens. Between about 1750 and 1800, several important developments took place in domestic furnishings and equipment: fireplaces and cooking facilities were improved; from the 1780s, the first good-quality oil lamps were manufactured in Birmingham, and the following decade the practicality of using gas for lighting was established. The improvement in the design of the water closet, therefore, was no isolated phenomenon, but part of a more fundamental change in the way people lived.

By the early 1800s, the manufacture of water closets by plumbers and brass founders was established in most large towns and cities. It coincided with the start of a boom in the building trade. The rate of house building grew steadily in the early decades of the nineteenth

'All the better class of closets in mansions built about twenty or thirty years ago will be found mostly supplied with this pattern.'

William Eassie on
Bramah closets, 1872.

GORE,
Plumber, Glazier
and Painter,
Saint Georges Place
CHELTENHAM.

Water Closets, Lift Pumps,
AND
Beer Machines
on the most Approved Principle.
NB. Air Traps for Drains.

An advertisement for water closets by Gore, plumber, glazier and painter, in St George's Place, Cheltenham from J.K. Griffith, *A General Cheltenham Guide*, 1818. The two water closets are shown complete with overhead cisterns and D traps. The valve closet is fitted with a sprung lever operating the mechanism and is shown with a hand pump supplying the cistern. On the right the pan closet is shown in action with the hand pull up and the rotating pan tipping the waste into the trap. (*Cheltenham Library*)

Thomas Crapper (1835–1910)

THOMAS CRAPPER was born in Thorne, near Doncaster, Yorkshire. As a young boy, he appears to have decided that his future lay in London, and aged only eleven walked to the capital where he found employment with a plumber in Chelsea. In 1861 he established his own business in Robert Street, and in 1866 moved to Marlborough Road where he established a manufactory including a brass works.

In spite of his fame, Crapper actually had very little to do with the development of the water closet. No major stages in its development are attributable to him, although he took out a patent for a self-rising closet seat in 1863 and another in 1902 for a trough closet fitted with water-sealed traps under each unit. His biographer, Wallace Reyburn, has emphasised his role in developing water waste preventing cisterns, but he was not responsible for any major improvements in these either. By the time he took out a patent for automatic flushing cisterns in 1891, 'pull and let go' syphonic cisterns were already well established. He also patented a disconnecting trap for drains, a seat-action automatic flush and, in 1903, an improved type of stair tread.

Thomas Crapper's place in the history of sanitary equipment, therefore, is not that of a pioneer, but rather as a representative of the many Victorian sanitaryware manufacturers who profited from efforts to improve standards of public health and domestic sanitation from the 1840s. Like many sanitary engineers, Crapper's technical skills were based in metal working – in his case, plumbing and brass founding – and not potting. Crapper produced a wide range of sanitary fittings including domestic ware – such as the attractive ceramic pedestal closet, the 'Marlboro', introduced in 1887 – and drain components. Cast-iron man-holes bearing his name are widely found: there are three in Westminster Abbey. In 1886 he was granted a royal warrant after installing new sanitary fittings at Sandringham House, the home of the Prince of Wales.

In 1907 the firm moved to 120 Kings Road, Chelsea and Thomas sold the business to his old partner, Robert Wareham and his nephew, George Crapper. He was remembered as a genial man of average height with a grey beard similar to that of George V. He died in 1910 and is buried in Elmers End Cemetery, south-east London. The firm continued to trade independently until 1966 when it was taken over by John Bolding and Co. who went bankrupt in 1969. Crapper and Co. was sold to another firm and lay dormant until acquired by Simon Kirby in 1999. Now back in business at Alscott Park, Stratford-on-Avon, Thomas Crapper and Co.'s range includes a water closet, the 'Venerable', cast-iron cisterns and lavatory basins based on items produced by the company in the late nineteenth century.



Thomas Crapper. (*Thomas Crapper and Co. Ltd*)

century reaching a peak in the 1820s and only falling off in the 1840s and 1850s. Late Georgian terraces, squares, crescents and detached villas were developed in new middle-class suburbs such as Highbury and Islington in London and Clifton in Bristol. Fashionable brick or stuccoed houses were built in spa towns like Cheltenham, Tunbridge Wells and Leamington and in seaside towns such as Brighton and Scarborough.²⁰ These late Georgian town houses were probably the first major category of housing to have water closets as more or less a standard fitting. They occasionally appear in contemporary advertisements of houses for sale or to let: for

example, in 1833, the auction particulars for Walcot House, 'a most comfortable and gentlemanly residence' on the London Road, Bath, included two 'patent' water closets.²¹ By 1821, when James Jennings compiled his *Family Cyclopaedia*, the water closet was sufficiently well known for him to describe it as 'a useful contrivance, the purpose of which requires no explanation'.²² Looking back in 1861, Henry Mayhew reckoned Bramah's valve closet had been 'brought into general use' around the late 1820s,²³ and in 1891 S. Stevens Hellyer gave a similar date for the adoption of the pan closet.²⁴ A Board of Health investigation in London in 1850 found that in the prosperous parish of St James, 65.86 per cent of houses had a water closet and 45.99 per cent in the less fashionable parish of St Anne's, Soho.²⁵ And having a water closet, as Mayhew observed, made quite a difference: 'The houses of the rich owing to the refuse being drained away from the premises, improved both in wholesomeness and agreeableness.'

Improvements continued to be made to both valve and pan closets. It was not long before earthenware replaced cast iron for the basins. Earthenware was easier to keep clean, did not rust and was more attractive. By 1802 Wedgwood were making earthenware water closet basins for several water-closet manufacturers, including Joseph Bramah. The most expensive closets were supplied with basins decorated with underglaze transfer decoration: Italian or classical landscapes in blue and white were particular favourites. Another important feature of pans was the fan or flushing spreader, a semi-circular piece of copper riveted to the pan in front of the inlet which spread the water into a wide fan inside the bowl. Bramah showed one in his patent of 1778. More effective still was to curl over the rim of the bowl to make a flushing rim so the incoming flush water was carried around the whole interior. The first patent for a flushing rim was taken out in 1855 by Edmund Sharpe, a sanitaryware potter in Swadlincote, south Derbyshire, but it is clear they were being made before this. Sharpe's patent describes an improved flushing rim, not the original concept.²⁶ Regulating the supply of flush water increasingly became a preoccupation of sanitary engineers to ensure an adequate quantity of flush water entered the pan while preventing undue waste. From the 1850s most valve and pan closets were fitted with a copper or brass cylinder and piston connected to the lever controlling the inlet valve. First patented by Frederick George Underhay, a London sanitary engineer, in 1852, these regulators delayed the closing of the inlet valve so that clean water continued to flow into the bowl after the handle had been released.*

'I consider the pan closet objectionable. The "container" is usually a reservoir coated with filth hidden by the pan holding the water in the basin.' T. Mellard Reade, Liverpool, 1884.

Henry Doulton (1820–97)



HENRY DOULTON was one of eight children born to John Doulton (1793–1873), who had joined a pottery in Vauxhall Walk, Lambeth in 1815. Henry joined his father's business in 1835, which was then trading as Doulton and Watts and located in Lambeth High Street. The company manufactured salt-glazed stoneware vessels, chiefly bottles for blacking, ink and beer. The younger Doulton rapidly acquired the skills of the potter and was soon playing a leading role in the running of the business. He introduced steam power for driving the throwing wheels, and by the late 1830s had begun manufacturing architectural terracotta and garden ornaments. To celebrate his coming of age, he produced a 300-gallon jar by hand, described as the largest stoneware vessel in the world.

It was the opening of new works in Lambeth to manufacture salt-glazed stoneware sewer pipes in 1845 which was to transform the fortunes of the company and establish Henry Doulton's reputation. Edwin Chadwick, the leading sanitary reformer along with Doulton's friends, the engineering inspectors, Edward Cressy and Robert Rawlinson, convinced him that the stoneware pipe would form the basis of a sanitary revolution. The success of the new factory in Lambeth and the increasing demand for sanitary pipes led to the opening of additional factories at St Helen's in 1847 and Dudley in 1848. By 1854, it was estimated that Doulton was responsible for a fifth of the sewer pipes produced in Great Britain. In 1854 John Watts retired and the company became known as Doulton and Co. Doulton manufactured his first ceramic sink in 1859, and by the 1860s was making stoneware closet pans. In 1877 Doulton entered a partnership with the old established firm of Pinder, Bourne and Co., at the Nile Street Pottery, Burslem, Stoke-on-Trent. They were important makers of tableware and earthenware sanitaryware. In 1882 Doulton gained complete control of the company and was able to consolidate his presence in the Potteries. In 1888 works were established in Paisley – primarily to manufacture cast-iron baths and cisterns – and production of fireclay goods at Dudley began in 1897.

By the 1890s Doulton and Co. were established as one of the leading sanitaryware manufacturers in Britain, but the company had, meanwhile, diversified into many other areas of ceramic manufacture, including art pottery and various types of tableware, including bone china. From the 1870s the company had been celebrated for its Lambeth 'faience', and in health exhibitions of the 1880s Doulton's stands often contained entire bathroom schemes featuring their own sanitary fittings and faience tilework. Doulton also staged impressive displays overseas, including the Philadelphia Centennial Exhibition of 1876 and the Chicago International Exhibition of 1893. Doulton was presented with the Albert Medal by the Royal Society of Arts in 1885 and knighted by Queen Victoria in 1887. The company continued to thrive after his death in 1897, and after a tortuous history of mergers in the twentieth century remains an important name in the field of bathroom ceramics.



Sir Henry Doulton. (*National Portrait Gallery*)

John Shanks (1825–95)



JOHN SHANKS began life as a plumber in relatively humble circumstances, but was to establish one of the leading sanitaryware companies in Britain. He was the son of a handloom weaver in Paisley and was apprenticed as a plumber to Wallace and Connell of Glasgow.

He worked as a journeyman plumber in the Paisley area until the mid-1850s when he established his own plumbing business in Barrhead, 7 miles south-west of Glasgow. The firm began on a small site in Main Street, employing eight people.

His first patent in 1863 featured a trapless water closet, which became the company's 'Number Four' and brought them sales nationwide. In 1875 he founded Shanks and Co., Sanitary Engineers, with his brother Andrew, who was also a plumber, and the firm expanded rapidly. They added an iron foundry to their works about this time, and in 1878 introduced the 'Independent' cast-iron bath with integral shelf, waste and overflow. By the 1890s the firm occupied a 7-acre site and employed 600 men. All stages of the production of sanitaryware were completed on the Main Street site, from iron moulding to enamelling: some twenty different trades were involved.

John Shanks showed considerable business acumen and technical skill. He recognised the potential of sanitaryware at a time when public awareness of the importance of public health and increased personal hygiene was growing. He was a prolific inventor, taking out some 100 patents by 1894. He took pride in the company's reputation for producing reliable, durable and reasonably priced goods which were found in hospitals and public buildings throughout Britain. They also supplied fittings to passenger liners including the *Lusitania* and the *Titanic*, and exported to many countries overseas, ensuring the company a worldwide reputation. Shanks married twice, and his son John with his nephew William carried on the business after his death in December 1895. The firm continued to flourish, adding the Victorian Pottery at Barrhead in about 1902. Shanks remained a household name in connection with bathroom fittings into the twenty-first century.



John Shanks. (*Mitchell Library, Glasgow*)

Thomas William Twyford (1849–1921)



THE TWYFORDS had been involved in potting in north Staffordshire since the seventeenth century. In 1849 Thomas Twyford had turned almost exclusively to the manufacture of sanitaryware at new works at Bath Street, Hanley. Upon his untimely death at the age of forty-six, his son, Thomas William Twyford, found himself in charge of the family business.

The business expanded rapidly with a second pottery, the Abbey Works, at Bucknall, Stoke-on-Trent in production by 1875, and then in 1887 the Cliffe Vale works was established. This occupied 9 acres of land alongside the Bridgewater Canal, Hanley. Twyford paid particular attention to the welfare of his employees in the design of these works, building spacious, well ventilated workshops to reduce the risk of pneumoconiosis – ‘potters’ asthma’ – caused by the inhalation of fine sharp particles of silica dust. Twyford then brought some experienced fireclay potters from Scotland to Hanley, and by late 1890 had added ‘porcelain enamelled’ fireclay articles to his range of goods. Further expansion in the early twentieth century saw the opening of a factory at Ratingen, near Dusseldorf, Germany to avoid high German import duties. In 1911 new fireclay works were built opposite the Cliffe Vale site, and the following year a new pottery was established at Etruria.

By the late nineteenth century Twyford’s were indisputably the largest makers of ceramic sanitaryware in the Staffordshire pottery towns and one of the leading makers in the country with a worldwide reputation. Twyford always ensured that his products represented the latest thinking in sanitaryware, yet his role as an innovator may have previously been over-emphasised. Although he took out thirteen patents for sanitaryware between 1884 and 1892, none of the major, lasting developments of this period can be attributed to him. Thus the ‘Unitas’, while being one of the earliest fully enclosed pedestal wash-out closets, was not the first: it was preceded by George Jennings’s ‘Pedestal Vase’. But if Twyford lacked Jennings’s originality, neither did he make his mistakes and the majority of Twyford’s products were extremely successful. They were, besides, some of the most aesthetically pleasing, and the range of decorative ceramic sanitaryware illustrated in colour in his highly ornate *Twentieth Century Catalogue* of 1901 arguably represents one of the all-time peaks in sanitaryware design. Today, as Twyford Bathrooms, based at Alsager, Cheshire, the company maintains its position as a major producer of ceramic sanitaryware.



Thomas W. Twyford.
(Twyford Bathrooms)

Josiah George Jennings (1810–82)



GEORGE JENNINGS was born at Totton, Southampton on 11 November 1810. He had no formal apprenticeship, but worked with his uncle who was a plumber and glazier. He moved to London in 1831 and set up on his own in Lambeth and then in 1838 at Charlotte Street, Blackfriars. In 1857 he moved to Holland Street, Blackfriars and finally to Palace Wharf, Stangate, where, by the 1890s, the company employed over 1,000 men.

George Jennings was unquestionably one of the greatest sanitary pioneers of Victorian Britain. He displayed considerable technical ingenuity and was responsible for many important innovations between the 1850s and the 1870s. Not all his ideas were a success, but he can be credited with the invention of wash-out closets, twin basin or plug closets, valveless water waste preventers and tip-up wash-basins. His first patent, for india-rubber lined taps, was taken out in 1847, and for this he was presented with a Royal Society of Arts medal in person by Prince Albert. In 1851 he offered to install the public conveniences at the Great Exhibition. His offer was initially turned down, but eventually accepted and he was awarded a prize for his water closet. The success of his facilities led to similar contracts at many important international trade fairs, including London in 1862, Paris in 1867 and Philadelphia in 1876, ensuring worldwide recognition for his sanitary fittings. He also constructed the sanitary fittings at the British hospitals at Varna and Scutari during the Crimean War.

In his early patents Jennings described himself as a brass founder, but he subsequently became involved in other manufactures relating to the production of sanitaryware. In 1854 he founded the South Western Pottery at Parkstone, Poole, Dorset. This became famous for its manufacture of sanitaryware and his own patent drain pipes as well as chimney pots, decorative brickwork and terracotta. His stoneware drain pipes were used for the laying of main drains in Portsmouth. Appreciating the value of india-rubber as a sealant in sanitaryware, he began his own production of rubber goods in London and at a branch factory in Birmingham. His forty or so patents included an improved rubber band and several varieties of seals for bottles and jars. His other business ventures included the development of housing in Clapham near his home.

He died on 17 April 1882 following a carriage accident and was buried at Norwood Cemetery, London. He married twice and had fifteen children and after his death the business was carried on by his sons who continued to use his name. They introduced one of the very first pedestal water closets, the 'Pedestal Vase' in 1884, and then in 1894, 'The Closet of the Century', one of the best-known British syphonic closets.



George Jennings. (Russell-Cotes Art Gallery and Museum)

Frederick Humpherson (1854–1919)



FREDERICK HUMPHERSON was the oldest son of Edward Humpherson from Chelsea, and in 1871 was apprenticed to Thomas Crapper. In 1876 Edward formed Humpherson and Co. with Frederick at 331 Kings Road, Chelsea. Their showrooms were at the end of nearby Beaufort Street and the corner of Fulham Road.

Frederick Humpherson took out four patents including one for a syphonic water-waste preventer in 1885 and another for a pedestal water closet in 1892. In 1885, when the free standing, all-ceramic pedestal closet was rapidly becoming fashionable for wash-out pans, Humpherson chose to use the pedestal form to enclose a basin and trap-type water closet. Humpherson called his closet the 'Beaufort' after his works, but also appears to have coined the term 'flush-down' or 'wash-down' as a general term for closets made with a water seal within the pan and not below it, as in hopper and cottage types. Simple two-piece closets were already in use, so Humpherson cannot be credited with the invention of the wash-down closet, but sanitarians and manufacturers clearly liked the name 'wash-down' and it was soon widely adopted. In this period of rapid development other makers soon had their own versions of the pedestal wash-down closet on the market. Nevertheless, Humpherson and Co. were able to claim, quite legitimately, that their 'Beaufort' was the 'original' pedestal wash-down closet.

When Humpherson died towards the end of 1919, he left the entire business to his younger brother, Alfred, who died in 1945, and in turn left the company to his son and daughter, Sydney and Edith. Edith's son Geoffrey Pidgeon entered the business in 1947 and sold the company in 1981, but immediately started Original Bathrooms (the name is taken from the original pedestal wash-down closet), based in Richmond, which is now run by Michael and John Pidgeon.



Frederick Humpherson.
(Original Bathrooms)