

IRON PRINTING PRESSES

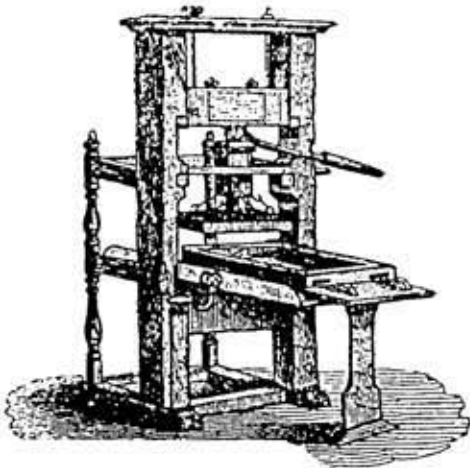
Iron hand presses replaced wooden presses in the early nineteenth century and, surviving the impact of steam and electricity, still continue in use for fine printing and village notices. Lord Stanhope invented the first iron press in 1800. The last four were made in 1940.

THE GUTENBERG REVOLUTION

Until the fifteenth century most books were copied out by hand. A few were printed by the laborious procedure of cutting the entire page, words and pictures, in relief on the surface of a block of wood; the block was inked with a water-based ink, and a sheet of paper laid on the top was rubbed down upon it. Books so produced are known as 'block books'. Johann Gutenberg (c1398-1468), a goldsmith of Mainz, began to experiment around 1440 with the casting of individual type characters in a lead alloy. His key invention was the carving in relief of a single letter on a hard metal punch, which was used to strike into a softer metal (copper) the intaglio version of the letter. This impression then formed the base of a mould onto which molten metal could be poured to produce a rectangular stem with the letter, now in relief again, on one end. Two sides of the mould were fixed, giving a constant length to the stem and a constant height to the letter. The varying widths of letter were accommodated by adjusting only the width of the mould. In this way the casting of an unlimited number of identical duplicate characters was easily achieved. These individual letters were long enough to be picked up and held in the fingers and could be composed into a page of text and locked up into a frame known as a 'chase' ready for printing on a press. After use, the characters could be released, distributed into a type case, and used again for other pages.

Gutenberg also devised an oil-based ink which would 'wet' the metal type and a paper suitable to absorb it. These aspects alone would nowadays involve a team of research technologists; it is astonishing that all these problems were resolved in so short a time and that the first complete printed book, Gutenberg's 42-line Bible, came from the press so perfect an example of typographers' art and printers' skill.

We are mainly concerned here with the fourth necessity for the success of the new technique - a press. Two types of press had been known from early times, actuated respectively by a screw or a lever. Gutenberg

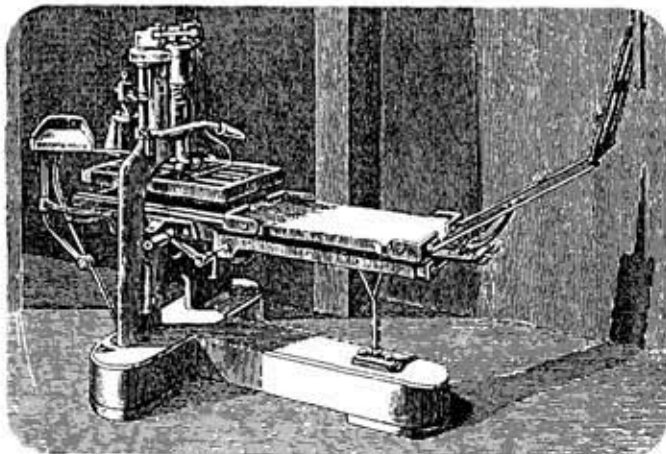


The Common (wooden) Press

chose the former; it would have been similar to a wine press or a wooden cider press. From 1460 to 1790 the hand-operated wooden press remained largely unchanged in design. Several attempts were made to increase its impressional strength, but apart from the introduction in 1600 of an iron screw (attributed to an engineer named Blau) none was successful. Although impressing of an inked wood or earthenware image on to paper goes back as far as AD 175 when it was practised by the Chinese, it is fair to say that Gutenberg invented printing from moveable type around 1450/55 (although in Holland the legend persists that one Laurens Janszoon Koster was there first). As every schoolboy will remember, it was William Caxton who introduced printing to England in 1476 when he set up his printing and publishing business in Westminster. Caxton was a well-to-do merchant, a member of the City of London's leading guild - the Mercers, and no mean scholar. He had learned about printing while staying in Cologne.

THE FIRST IRON PRESS

The traditional wooden press, known as the Common Press, was only strong enough to print one folio page at a time. In order to print the double sheet necessary for folding and sewing into a binding, the assembled pages of type, called the 'forme', had to be moved so that the second folio page came under the platen of the press and another impression taken - a most time-consuming process. For the production of a sheet as large as a newspaper or a sheet of four quarto or eight octavo pages much greater strength was needed. The development of the iron hand-operated printing press relates to the pursuit of this aim.



The First Iron Press

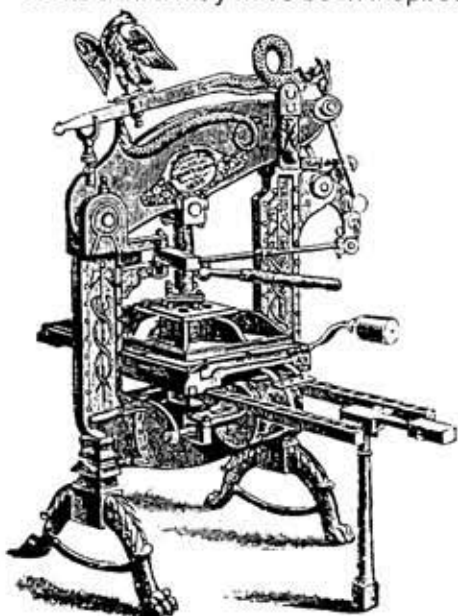
The Third Earl of Stanhope (1753-1816), a man 'devoted to scientific enquiry and free from the conservatism of the average printer', has the distinction of having invented and made the first iron printing press in 1800. He declined to have the press patented and it was made for him by R Walker, Ironsmith of Vine Street, Piccadilly. Others at that time were still striving to make a stronger press which would permit increased output to meet the growing demand for newspapers and books. Stanhope was the first to succeed in this aim this his original contribution of a system of levers which increased the speed and power of the press by accelerating the rise and fall of the platen and gearing its movements so that the power was at its

greatest when contact was made between the paper and the inked type.

Two men working at top speed on one of these presses could print 250 impressions in an hour although the average over a twelve-hour working day would more likely be in the region of 200 sheets per hour. *The Times* was printed on a battery of these presses from 1800 to 1814. Several hundred Stanhope presses were made. The oldest known survivor is number 5, dated 1804, which is in the Gunnersby Museum in London. There are twelve other Stanhopes recorded. Number 7 is in the printing museum at St Bride's Institute off Fleet Street. The Stanhope press had a considerable success in France and Germany.

THE COLUMBIAN PRESS

The next successful press to follow the Stanhope was the Columbian, invented by George Clymer (1754-1834) of Philadelphia. First made in 1813, this was the first iron press to be manufactured in large numbers by foundries in several countries. Clymer started experimenting with improvements to the wooden press in 1800. He abandoned the screw principle which had been used for more than three centuries and reverted to the other system known to antiquity, the lever. This method of obtaining increased printing pressure looks as if it may have been inspired by the beam engine. Clymer certainly knew about the beam engine.

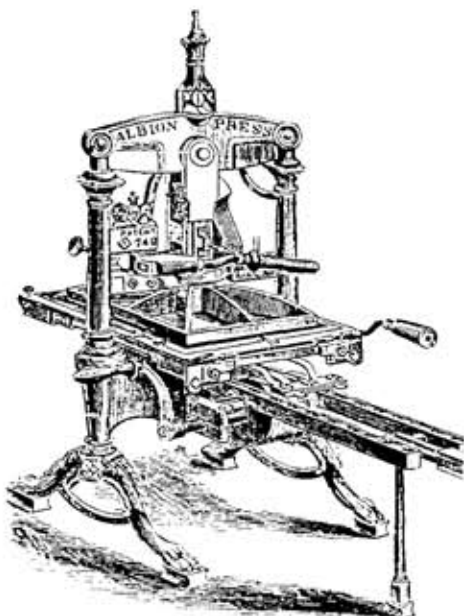


The Columbian Press

Clymer certainly knew about the beam engine that was invented by Thomas Newcomen in 1712. It is known that he had seen a copy of a manual describing this engine in detail, from which, it has been suggested, he got the idea for the 'great lever' as a means of multiplying pressure to the platen of his press. Some thirty Columbian presses are known to have been sold in the eastern cities of America but printers across the continent appear to have preferred the cheaper, lighter, wooden presses which were easier to transport and simpler to erect. Having apparently saturated that American market of his day, Clymer moved to London in May, 1817, at the mature age of sixty-three, patenting his press there in the November of that year. Who actually made the early Columbians is somewhat uncertain. Clymer certainly negotiated with R W Cope in London for the manufacture of a press but he, Clymer, had his own premises and was selling the Columbian under his own name from 1818 to 1828 which at the same time, from 1820 onwards, Cope was making and selling his own Albion press. They were both working from addresses in Finsbury Street.

The Columbian press is a masterpiece of decorative ironfounding with quasi-heraldic mouldings on every possible square inch of its surface and the whole surmounted with an American bald eagle which functions as a counterweight. The 'serpent' on the great beam is actually a dolphin used in the trade mark of Aldus Manutius, the great Venetian publisher and printer, in the late fifteenth and early sixteenth centuries, but it looks more like the dolphins cast as handles on early cannon or on the supports for Victorian park benches. The caduceuses derive from Hermes, the herald and messenger of Greek mythology, and are intended to symbolise the speedy news-distributing activities of the press.

THE ALBION PRESS

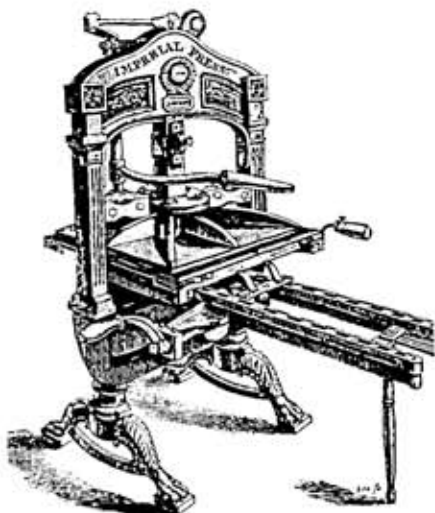


The Albion Press

Three years after Clymer arrived in London in 1817, R W Cope, his neighbour in Finsbury Street, designed and put on the market his own press which he called the Albion. It was simpler in design and construction and used an entirely new method based on a toggle or fulcrum mechanism for applying pressure to the platen. Albion presses were less popular than Columbians in the early days; Cope only sold 200 before he died in 1828. His successor, John Hopkinson, improved the press and went on to sell his thousandth Albion in April 1839. Hopkinson had been Cope's foreman. He died in 1864, when the business was taken over by James Cope, son of R W Cope.

Albion presses continued to be made by Dawson, Payne and Elliot and their predecessors in Otley until 1940 when the last four were made to meet an order from the India Office Store in Bangalore. Albions became almost standard equipment for the Private Press movement. They were used by Dr Daniel in Oxford in the 1880s and by William Morris at Kelmscott Press in the '90s. The Doves Press and Ashendene Press and others followed, all using Albions for their exquisite limited editions on handmade paper.

THE IMPERIAL PRESS



The Imperial Press

An Imperial press made by J Sherwin and J Cope was on the market in 1828. It incorporated the level principle invented by Stanhope and a fulcrum and wedge similar to that used in the improved Albion in 1830. It used a leaf spring instead of a balance weight or coil spring to lift the platen and was generally more mechanically efficient than the Albion at that time. Because of its robust strength and powerful impression it was often used as a bookbinders' blocking press or 'arming' press either by original design or by modification.

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It is remarkable how long the hand press survived in commercial use after the arrival of power-driven printing machinery. In one form or other it had a useful life for 125 years. A patent for a cylinder press was out in 1748 but it was never made. One was built in Connecticut in 1796 but was never brought into commercial use. The first commercially effective printing machine using a cylinder instead of a platen to make the impression of type on paper was designed and built for *The Times* by F Koenig and A Bauer and used to print that newspaper from the issue dated 29 November 1814. This press, driven by steam, depended a good deal for its success on the development of composition inking rollers made from glue and molasses 'with a pinch of carbonate of soda added'. It was the combination of steam power and mechanical ingenuity, plus the growing demand for newspapers and books, that transformed the printing trade from the manual craft it had been for four hundred years into the great mass-production industry it had become by the early part of the 20th century.