The Ingenious Pen: American Writing Implements from the Eighteenth Century to the Twentieth

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THE HISTORY OF MODERN AMERICAN WRITING IMPLEMENTS is not the story of individual inventors of genius struggling in laboratories to develop brilliant innovations in writing tools. It is instead the story of the slow evolution of practical means of solving age-old problems with the assistance of developing technology. Although each development built on its predecessors, several points in the continuum are milestones. These include Joseph Gillott's 1830 development of a mechanized stamping press for steel pens; L. E. Waterman's discovery of an effective principle for fountain pens; the 1868 patent of Sholes, Glidden, and Soulé for a practicable typewriter; and Georg and Ladislao Biro's development of the modern ballpoint. Even the developers of the most successful writing implements remain largely just names, rather than heroes of science and technology, while the instruments they developed have become integral parts of our daily lives.

The Quill

The quill pen was the primary writing instrument of the western world from the dark ages until the second third of the nineteenth century. It was the basic writing tool used in America for more than two centuries. The word *pen* itself is derived from the Latin *penna*, meaning feather. Quill pens were made of the primary feathers of common birds, most often of geese, but also of crows, swans, and others. Preparation of quills for writing was simple. The feathers were dried, sometimes in hot sand, the exterior membrane was removed, and the remaining tubular structure was either used immediately or hardened by various means including dipping in acid to make the quill's point stronger and longer lasting. The quill was finished by three basic strokes of a pen knife.

The quill was a functional, inexpensive writing instrument which remained in use long after introduction of other writing tools. Its form was the basis for later steel and gold pens. Yet the quill was far from ideal. As a writer of the second half of the nineteenth century stated, the quill "is troublesome to most writers to make perfectly, soon breaks, grows blunt, and 'sputters.' "[1] With the industrial devel-

[1] John Foley, *History of the Invention and Illustrated Process of Making Foley's Diamond Pointed Gold Pens, with Complete Illustrated Catalogue* (New York: Mayer, Merkel, and Ottoman, lithographers, 1876), p. 74.

opment of the nineteenth century, replacements for the quill that overcame many of its faults became possible.

The Steel Pen

The steel pen, the quill's most important immediate successor, was introduced gradually over half a century. A pen fashioned in 1780 for chemist Joseph Priestley by Samuel Harrison, a Birmingham, England, manufacturer, is generally considered to be the first steel pen produced in modern times. The pen was made of sheet steel that was rolled into a tube so that a slit similar to that of the quill was formed where the metal joined to form the point. The pen point and the shaft were part of a single, inseparable unit, a form later known as the barrel pen. In 1803, other barrel pens were advertised and sold in London.

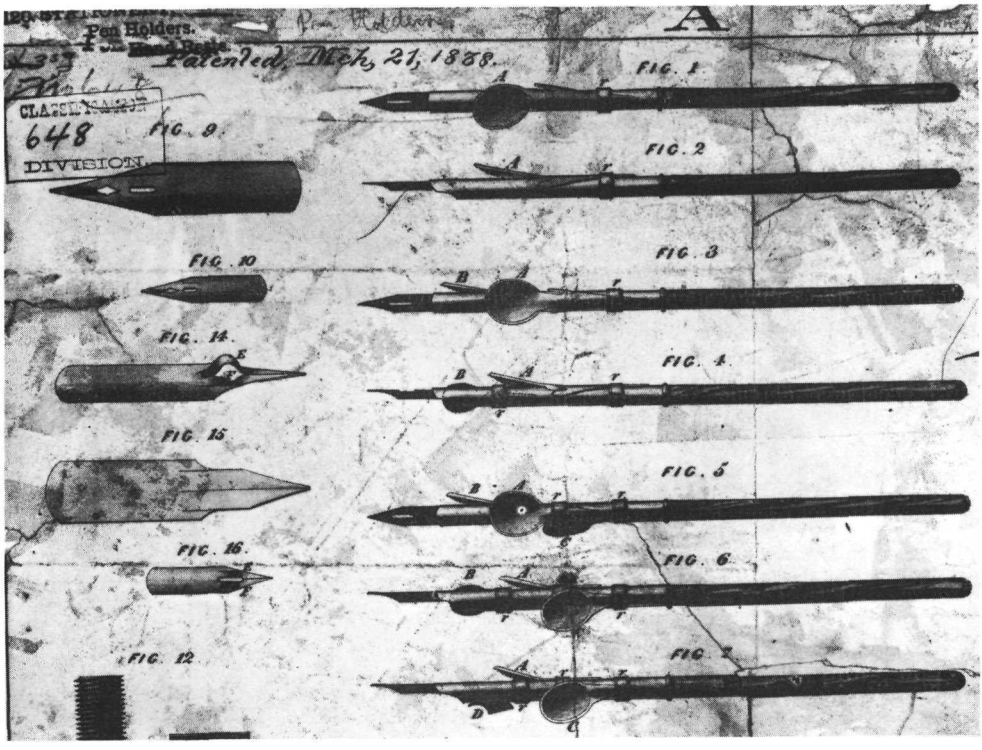
Early steel barrel pens were expensive not only because each was manufactured by hand but also because each required complete replacement when the point wore out. This problem was solved through application of a concept developed for the quill. In 1809 an English inventor, Joseph Bramah, patented a machine for cutting a single feather into a series of quill points or nibs, each of which could be inserted into a reusable pen holder. Over the next several decades, this development was applied to the steel pen. Gradually the manufacture of steel pen nibs almost completely replaced manufacture of barrel pens.

The price of the steel pen was cut even more by use of mechanized presses in their manufacture. Joseph Gillott has been given substantial credit for this innovation. In 1838 he obtained a United States patent for his process.[2] Gillott also developed means to increase the pen's flexibility. The earliest steel pens had been shaped to look much like quills, with a single slit in the point. Gillott discovered that a hole at the base of the point's central slit and slits on each of the point's shoulders gave it good flexibility. Over time, a variety of shapes and cuts were introduced in the steel pen so that many personal preferences in point and flexibility could be satisfied.

By the second third of the nineteenth century, the price of the steel pen had been reduced to a fraction of its original level, and the steel pen rapidly replaced the quill as the most popular writing instrument in everyday use.

At the time the steel pen was being developed by Gillott and others, attempts to develop a gold pen already were in progress. Gold appeared to have significant advantages over steel for a high-quality writing point. The acids of ink corrode steel and require that great care be taken to keep a pen point clean. Further, despite regular advances, obtaining adequate flexibility in a steel nib remained a persistent problem. Because of this, a writer observed in 1876 that "it is now well established that [the use of the steel pen] subjects persons to cramps of the muscles and to a peculiar paralysis of the hand and arm."[3] In contrast, gold pens were both flexible and resistant to corrosion. The softness of gold meant, however, that an effective gold nib required a hard writing point of another substance. John Isaac Hawkins developed a successful method of embedding small pieces of iridium, a metal of the platinum group, in the tip of a gold pen. He was

[2] U.S. Patent 648 (21 March 1838), granted to J. Gillott, H. C. Windle, and J. Morris.
[3] Foley, *History of the Invention*, p. 46.



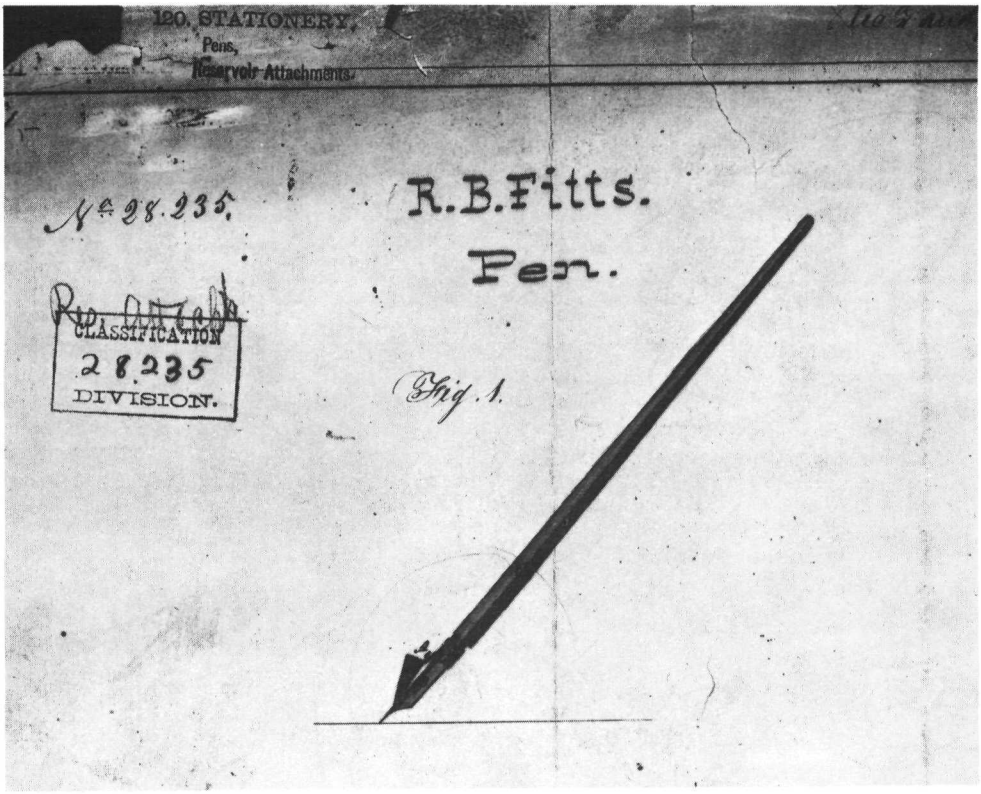
Drawing for a patent for making metallic pens. U.S. patent 648, issued 21 March 1838 to J. Gillott, H. C. Windle, and S. Morris.

thus able to create a gold pen with a smooth, lasting, writing point. His first pen was sold in London in 1834, and in 1835 he sold his business to a Cleveland entrepreneur, Aaron Porter. Several years later, Porter imported the manufacture of gold pens to the United States. By mid-century, the United States was the world's leader in gold pen manufacture. By 1876 John Foley, a manufacturer of gold pens and ear picks, was able to report that more gold pens were made in New York in twenty days than in all other places in the world during a year.[4]

Reservoir and Fountain Pens

Even before the steel or gold dip pen achieved wide popularity, inventive entrepreneurs sought ways to design a quill or metal pen that would hold its own ink supply. The value of this feature was painfully evident to penmen. Writing was slowed inevitably by the frequent need to replenish the ink supply. To write away from one's desk was cumbersome and required carrying an ink bottle likely to leak in transit or tip while in use.

[4] Much of the information available about the development of the gold pen is based on Foley's correspondence with Hawkins and others, which Foley described in his advertising publication, cited above. While Foley was only one of a number of gold pen manufacturers in New York, he may have been the most notable. As an elected member of the New York City Board of Supervisors in 1871, he was credited by the *New York Mail* as the first to discover the Tammany fraud and bring it to public attention.



Patent drawing for an improved ink reservoir for pens. U.S. patent 28235, issued 8 May 1860 to R. B. Fitts. (Illustrated patent drawings are from Records of the Patent Office, Record Group 241, National Archives.)

The reservoir pen, which had been known in the eighteenth century, offered a partial solution to the first problem. While reservoir pens were sometimes complex in design, their principle was simple. An open pocket or recess was fixed to the back of a quill or steel dip pen and this reservoir was filled by submerging it in an inkwell. Although the ink supply was not large, it would permit the penman to write several times what he could with a single dip of a quill or metal pen. These devices remained in use until the twentieth century.

Attempts to create an effective, leakproof fountain pen began even before the introduction of the steel pen. The hollow body of the quill offered a natural reservoir for ink which could be enclosed and from which the ink could flow to the pen point by force of gravity. Early attempts made with the steel pen were also based on this principle. Between 1830 and 1873, no fewer than fifty-eight fountain pens were patented in the United States.[5] Although such fountain pens, whether quill or steel, had the elegance of simplicity, they were far from effective. The flow of ink, once established, would be likely to continue even after the pen

[5] M. D. Leggett, *Subject-Matter Index of Patents for Inventions Issued by the United States Patent Office from 1790 to 1873, Inclusive* (Washington: Government Printing Office, 1874).

was removed from paper. Unwanted blots and splotches were frequent. Further, more often than not, the pens leaked when not in use.

In 1884, Lewis Edson Waterman developed an effective fountain pen that became the model for future pens.[6] To control the flow of ink its feed-bar used the principle of capillary attraction, the principle that liquids ignore gravity when confined in narrow channels. Waterman's pen had hair-thin capillary channels at the base of a feed-bar at the neck of the pen to lead ink to the pen point. Capillarity kept the ink in these channels until the touch of the pen point to paper began the flow of ink. When the pen point was removed from the paper, capillarity prevented additional ink flow.

Fountain pens continued to be improved during the decades following Waterman's development. Early fountain pens, including Waterman's, were filled manually with an eyedropper. Early in the twentieth century, the Arthur A. Waterman Company, a company unrelated to the L. E. Waterman firm, developed a successful self-filling pen. Ink was stored in a flexible rubber sack in the pen handle. When a button on the top of the pen barrel was pushed, the rubber sack was deflated. On release of the button, ink was sucked into the reservoir. In 1908, W. A. Scheaffer, of Iowa, developed the lever self-filling mechanism which eventually was adopted by most manufacturers. Similar to A. A. Waterman's, the Scheaffer pen had a flexible ink reservoir. When a lever placed in the center of the pen barrel was pulled, a bar within the pen pushed and deflated the ink sack.

With the success of the self-filling mechanisms, the fountain pen was established firmly as the principal pen of the time. It was improved in minor ways in succeeding decades. In 1926 stainless steel nibs were introduced, which were highly resistant to corrosion from writing inks. A cartridge-filled pen enjoyed brief popularity. Finally, in 1956 Scheaffer introduced one of the oddest approaches to the self-filling mechanism, the snorkel. At the twist of the barrel a thin tube came out of the pen point. The tube could be placed in an ink bottle to suck up ink while the pen point remained dry.

By 1956 when the Scheaffer snorkel came on the market, the fountain pen no longer was used universally. The ballpoint already accounted for 80 percent of the output of pens in the United States.[7]

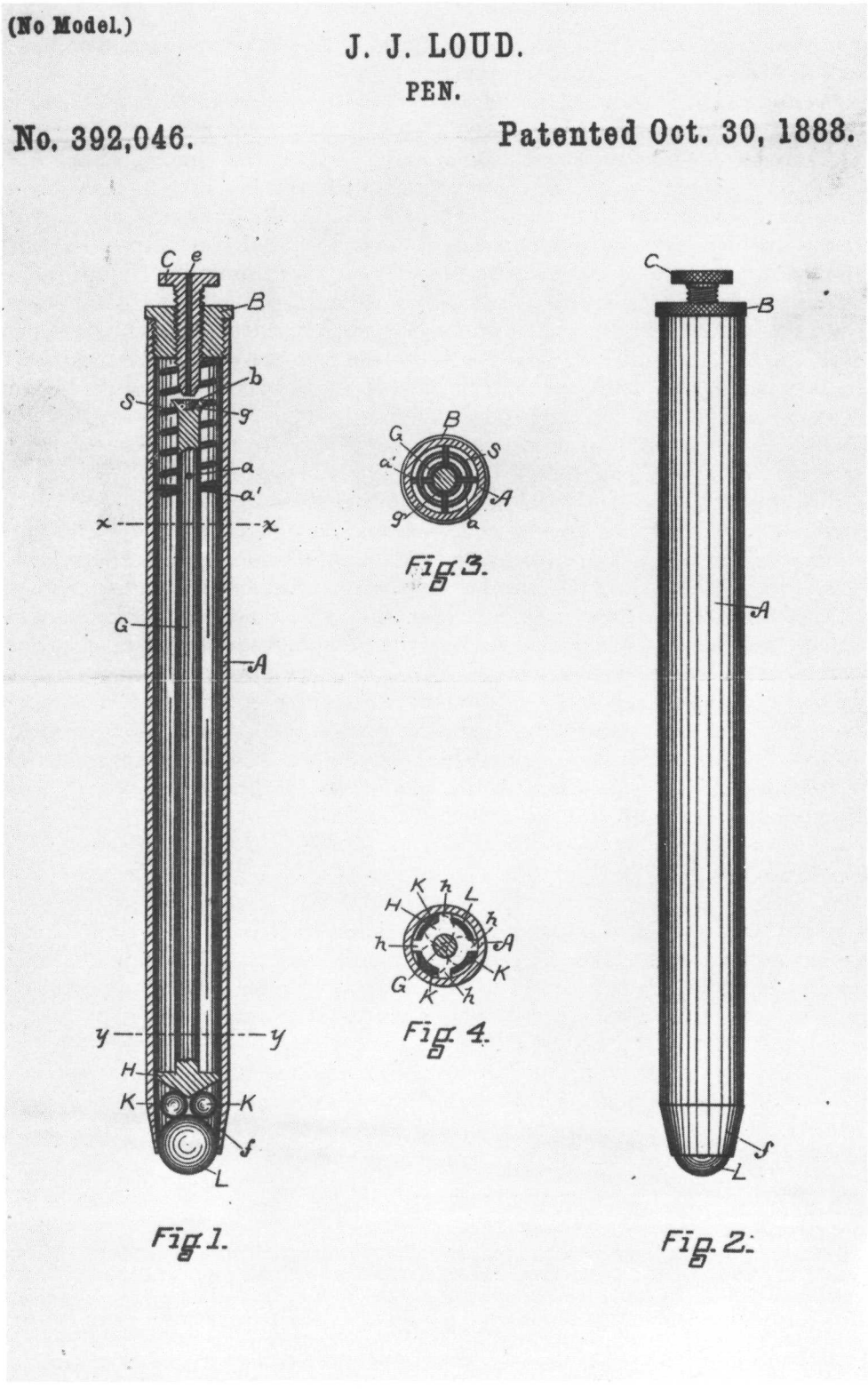
The Ballpoint Pen

In 1888 an American inventor, John Loud, patented a ballpoint pen which he claimed was "especially useful, among other purposes, for marking on rough surfaces such as wood, coarse wrapping paper, and other articles where an ordinary pen could not be used."[8] A ball bearing was placed in a closely fitted socket. While the ball bearing rotated, it fed ink from the ink reservoir to the writing surface. When the pen's screw cap was closed, the air source was sealed off and

[6] Waterman's development of his successful fountain pen is described in a publication advertising Waterman's Ideal Fountain Pen, which ascribes much of Waterman's success to his recognition that "ink was a difficult and dangerous liquid to carry in the pocket." (Records of the President's Commission on Economy and Efficiency, 1905–13, Records of the Bureau of the Budget, Record Group 51, National Archives Building.)

[7] R. Match, "Things You Never Knew About Your Fountain Pen," *Popular Science* 169 (September 1956): 166.

[8] U.S. Patent 392,046, 30 October 1888.



John Loud's patent drawing for a precision ballpoint. U.S. patent 392046, issued 30 October 1888.

theoretically ink could not escape from the pen. Loud's pen was not developed and his invention was quickly forgotten.

In the twentieth century, the ballpoint pen was reinvented and patented in 1938 by two Hungarians, Ladislao and Georg Biro.[9] Similar to Loud's invention of fifty years earlier, the Biro ballpoint had a rotating ball bearing placed in a socket at the tip of a pen. The ball bearing transferred ink from its reservoir to the writing surface. At the outbreak of World War II, the Biros moved to Argentina where limited production of the pens began. In the closing years of the war, production of the Biro pens was licensed throughout the world. Before the licensed producers of the pen could bring out their ballpoint in the United States, however, American businessman Milton Reynolds had developed his own pen based on the Biro model. Reynolds had seen the Biro pen in Argentina during a business trip in June 1945. He redesigned its feeding system and brought his pen to the market in 1945. Reynold's pen, advertised as "the miraculous pen that will revolutionize writing" was an enormous commercial success, which the Biros benefitted from only indirectly.[10]

Unfortunately, the early ballpoints, whether the Biro or the Reynolds, wrote poorly. The pens skipped and clogged, their ink smeared, faded, and, with a little pressure, could be lifted from the paper and reapplied elsewhere. In 1949, chemist Fran Seech developed a successful new ballpoint ink based on glycol for the manufacturers of the Papermate pen. This new ink had a self-sealing quality that assured quick drying but tended to leave the pen point clean. The ink was permanent and wouldn't dissolve in water. After development of this improved ink, the ballpoint rapidly replaced the fountain pen as the predominant pen in everyday use in the United States. While developments and improvements continue to be made in the ballpoint—for example the recent introductions of erasable ink and the liquid ballpoint—the ballpoint pen we use today is essentially the one invented by John Loud and reinvented by the Biros.

The Fiber-Tip Pen

In the last decade and a half, an entirely different type of writing instrument has become important in the United States, the fiber-tip pen. This pen was developed in Japan and introduced in the United States in the early 1960s. Fiber-tip pens have been developed in a variety of points from extremely fine to broad, and in many colors. Depending on the manufacturer and form of the pens, they may be made of a wide variety of substances but all must be sufficiently porous to allow ink flow to the pen point through the forces of capillarity and gravity, and firm enough to make a lasting point. Treated bamboo, as well as thin plastic fibers or tiny plastic spheres tightly glued together, are among the materials from which

[9] U.S. Patents 2,258,841 and 2,265,055.

[10] An entertaining and comprehensive account of this story appeared in the *New Yorker* of 17 February 1951. This account suggests the excitement that greeted the new pen: "At nine-thirty on the morning of October 29, 1945, five thousand people were waiting to swarm through the doors, and fifty extra policemen were hastily dispatched to restrain the throng. Inside the store, where ballpoint pens lay heaped in gleaming piles on the counters of two aisles running almost the entire length of the Thirty-second Street side, buying quickly reached the proportions of a stampede. In an attempt to break up the jam, Gimbel's hurriedly set up emergency counters, and during the day, fresh supplies of pens were rushed here by plane."

the pens have been manufactured.[11] Because of their versatility, low cost, and ease of use, fiber-tip markers have become extremely popular. That they will become a permanent and significant part of the equipment of a twentieth-century writer seems likely.

The Pencil

Pencils as we know them today were first made possible by the 1564 discovery in Borrowdale, England, of a deposit of nearly pure graphite which was cut in various shapes, wrapped in string or small boards, and used as a writing or marking tool. By the eighteenth century, the Borrowdale deposit was largely depleted and other sources of materials for the pencil were sought. In about 1760, a pencil maker in Nuremberg, Germany, had perfected the manufacture of a pencil made of a combination of graphite and clay bound together by adhesives and formed in wooden molds which were cut individually to form the pencil. Composition pencils made in this way were improved late in the eighteenth century as manufacturers learned to fire the pencil and to vary the combination of clay and graphite to obtain different degrees of hardness. By the first quarter of the nineteenth century, composition pencils were in general use in Europe and the United States. These continued to be altered and improved in small but significant ways throughout the century. In 1846, exterior varnish was introduced to make the pencil more comfortable to hold. Within a decade the eraser attached to the pencil head had been developed and put into general use.[12] Copying and indelible pencils were developed late in the nineteenth century by mixing aniline dyes with the graphite and clay paste. In 1905, the *Scientific American Supplement* announced the advent of a paper-covered pencil, the point of which was uncovered by unwinding the paper wrapped around it.[13] This invention remained something of a novelty, although one that has been produced in limited quantities for many years. The most recent development has been the use of synthetics to reproduce every element of the pencil, including the writing material itself.

Attempts to devise an effective mechanical or propelling pencil began early in the nineteenth century. Most designs consisted of a mechanism for the user to turn which then turned a spiral to push the lead through the pencil cylinder until the point projected for writing. The writing point could be retracted by reversing the turn. By 1900 the propelling or mechanical pencil had reached approximately the form we now know.

The liquid lead ballpoint, introduced by the Parker Pen Company and Scripto in 1955, represents the most significant change from the form of the composition

[11] Wilson R. Harrison, *Suspect Documents, Their Scientific Examination* (New York: Praeger Publishers, Inc., 1958), pp. 546–47.

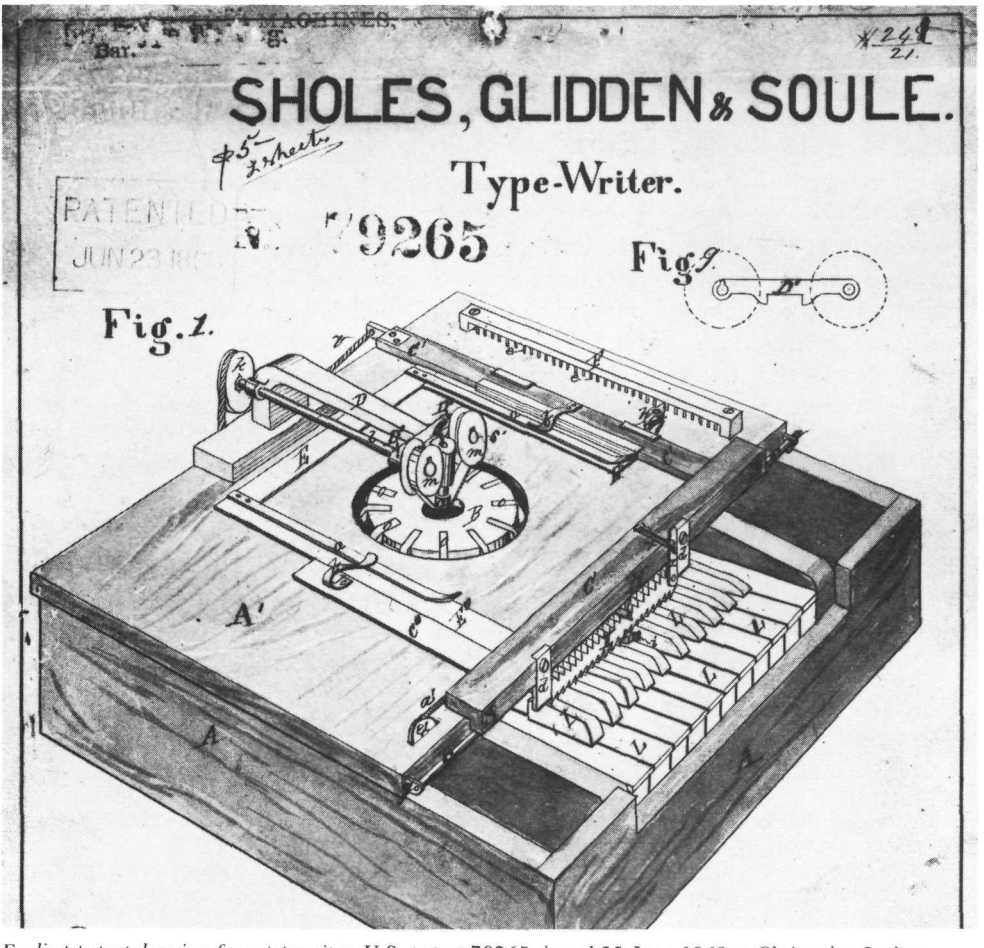
[12] While caoutchouc, or rubber, was known as early as the eighteenth century as a substitute for bread crumbs in erasing pencil marks, the development of an integral pencil and eraser stems from the mid-nineteenth century. The state of the pencil eraser between 1856 and 1866 is described in great detail in a Supreme Court case of 1874 concerning the validity of an 1867 patent for a "new and useful rubber head for lead pencils" (Rubber Tip Pencil Company v. Howard, 87 U.S. 410 [1874]). The final judgment in the case, delivered by Chief Justice Waite, expresses a problem faced by many inventors of improvements to common writing tools: "The idea of this patentee was a good one, but his device to give it effect, though useful, was not new."

[13] *Scientific American Supplement* 59 (27 May 1905): 24576–78.

pencil developed in Nuremberg in the mid-eighteenth century. It worked on the same principle as the ballpoint pen but instead of ink contained a fluid with suspended graphite that made a pencil-like mark and could be erased. Scripto's "fluidlead" used a fluid claimed to be a "secret formula" developed by chemist Fran Seech who in 1949 had developed the first successful ballpoint ink.

The Typewriter

The typewriter represented a complete break with the tradition of hand-held writing instruments. Before its invention, the potential significance of the typewriter was recognized widely. In its issue of 6 July 1867, the *Scientific American* stated that "not only would the inventor of a successful Writing Machine confer a benefit on all mankind but would also, incidentally, reap a fortune."[14] While all inventors of typewriters did not grow rich, the development, manufacture, and



Earliest patent drawing for a typewriter. U.S. patent 79265, issued 23 June 1868 to Christopher Latham Sholes, Carlos Glidden, and Samuel W. Soulé.

[14] *Scientific American* (6 July 1867).

widespread acceptance of the typewriter changed the appearance of written documents irrevocably and contributed to a social revolution.

The first practicable typewriter was invented in a Milwaukee machinists shop and patented by Christopher Latham Sholes, Carlos Glidden, and Samuel W. Soulé. The inventors improved and refined their original model and produced several experimental machines. After several years, a promoter, James Densmore, convinced Philo Remington of Ilion, New York, to manufacture 1,000 of these machines in his factory, which had been built for sewing machine, farm equipment, and gun manufacture. The first Remington typewriter, attached to a sewing machine base, was sold in 1874. The Remington Model 1 bore a remarkable similarity to the conventional modern typewriter. It had a four-bank keyboard, keys which struck the platten at the same place, and a carriage that moved one space to the left when a type key was depressed. Unlike modern typewriters, however, it lacked a shift key and typed only in capitals. Because its keys struck the underside of the platten, its writing was invisible to the typist. The carriage was returned by means of a foot pedal. The Remington Model 1 met with curiosity and some commercial success.

In 1878, Remington introduced the Model 2, which had a shift key to permit typing with both capital and lower-case letters. Not all other typewriter manufacturers accepted the shift key as the best mechanism, however. The Yost and Caligraph machines were both introduced and manufactured with double keyboards. The Smith-Premier continued to make its Model 10 with a double keyboard through the first decade of the twentieth century. The advent of typing instruction and the touch technique eventually demonstrated beyond doubt, however, that the shift key was the most effective arrangement. Eventually double keyboard models disappeared from the market.

One of the major weaknesses in the Remington Model 1 was that the line of typing was invisible to the typist. In 1892, Thomas Oliver patented and produced the first visible-writing machine on which the typist could see the writing. It had type bars in slanting rows on either side of the printing point. Franz Xavier Wagner patented in 1893 another visible-writing machine. It eventually was manufactured as the Underwood. While the advantage and popularity of "visible" typewriters was immediately obvious to typists, "blind" writers were produced into the first decade of the twentieth century.

The Remington Model 1 had type keys suspended in a basket below the carriage in a method reminiscent of conventional modern machines. Despite the success of this method, other manufacturers experimented with different modes of bringing the type to paper. The Crandall of 1893 had type on a cylindrical sleeve which rotated to the appropriate letter. The Columbia and Blickensderfer used a typewheel, the predecessor of the IBM Selectric. The Oliver of 1894 had type bars above the surface of the paper; the bars struck downward, thus permitting the typist to see the letters as he typed.

The first portable typewriter was the Blickensderfer, patented in 1892 by George C. Blickensderfer of Connecticut. A popular portable model was the folding typewriter introduced by Corona in 1912.

The arrangement of letters on the typewriter keyboard was also a matter of much disagreement. The first experimental keyboard arrangement was alphabetical. Christopher Latham Sholes found, however, that an alphabetical arrange-

ment resulted in juxtaposition of certain commonly used letters and resulted in many jammed keys. Sholes asked his brother-in-law, a schoolteacher, to develop a lettering order in which the machine's keys would come, as often as possible, from opposite sides of the machine. The familiar QWERTY key arrangement was the result.[15] The non-scientific character of this arrangement was a common complaint from its earliest use. The Hammond typewriter company tried to introduce a better version, its "ideal" keyboard, which also was used on the Blickensderfer, but this alternative never gained enough adherents to become predominant.

Theorists continue to debate the most effective arrangement of the typewriter keyboard. In 1905, an international conference was held to discuss this issue and August Dvorak in 1932 developed a simplified keyboard called DSK. Despite all the interest, however, the QWERTY arrangement used on the Remington Model 1 remains virtually the only arrangement in common use.

The concept of using electricity to power a typewriter developed early. In 1871, George Arrington and Thomas Edison patented an electrically driven, type-wheel typing machine which was never successfully manufactured. In 1902, Blickensderfer successfully produced an electric type-wheel writer, the first electric typewriter to be produced commercially. Its success was modest. Several manufacturers, including Woodstock and Electromatic (later IBM) introduced electric models during the 1930s; however, no electric machine gained wide acceptance until after World War II.

During the mid-years of the twentieth century several other significant features were introduced. In 1946, IBM introduced its Executive typewriter with proportional spacing, followed in 1961 by its Selectric, which uses a globe-like typing element and stationary paper carriage instead of type bars and a moving carriage.

Copying Techniques

Before the typewriter and ballpoint pen made the use of carbon paper an effective means of making extra copies at the time of writing, and before electrostatic copiers made creation of duplicate copies after a document had been created a matter of extreme simplicity, writers had to use other techniques to obtain extra copies of their correspondence. While many writers depended on copy clerks to reproduce fair copies for their records, others turned to more ingenious and less labor-intensive methods. These will be the final subject of this paper. I will not consider here the development of multiple copying devices such as the stencil, duplicating equipment, and electrostatic copying, which are fascinating subjects in themselves. Instead, I will confine this discussion to devices used by the writer at the time of writing.

Among the earliest of copying devices, and certainly the simplest in concept, was the machine that held multiple pens. In 1799, Sir Marc Isambard Brunel, builder of the world's first underwater tunnel, patented in England a device holding two quills, each equipped with its own inkwell and linked by a series of levers. The writer wrote with one of the pens on one sheet of paper and the second pen simultaneously produced identical writing on a second sheet. Thomas Jefferson used a similar invention known as the "polygraph." In 1806 he wrote

[15] Wilfred A. Beeching, *Century of the Typewriter* (London: Wm. Heinemann, Ltd., 1974), p. 39.

to James Bowdoin: "I think it the finest invention of the present age and so much superior to the copying machine that the latter will never be continued a day by one who tries the polygraph. . . . As a secretary which copies for us what we write without the power of revealing it, I find it a most precious possession to a man in public business."[16] Despite Jefferson's evident satisfaction with this invention, multiple pens never received widespread popularity. Curiously, however, in the early twentieth century, a closely related device, the Signagraph, appeared. The Signagraph, which could hold up to 10 pens simultaneously, was designed to facilitate check signing and was used for this purpose by the U.S. Treasury Department. Its manufacturers boasted in advertisements that "upon one instrument a writer has signed 14,000 checks in 2 hours."[17]

Another group of copying devices used a form of double-sided carbon paper and a stylus to create both an original and a copy. An early version of such a device was Ralph Wedgwood's manifold stylographic writer, patented in England in 1806, and developed to assist the blind to write.[18] Wedgwood's patent described a crude, double-sided carbon paper, produced by soaking a piece of paper in printer's ink. This "carbonic" or "carbonated" paper was inserted between a sheet of regular writing paper and a thin sheet of tissue. The writer wrote with a stylus on top of the thin sheet along guide wires. When used in correspondence,

Treasury Department disbursing clerk using a Signagraph, ca. 1910. (Records of the Public Buildings Service, Record Group 121, National Archives.)

[16] Andrew A. Lipscomb, ed., *The Writings of Thomas Jefferson* (Washington, D.C.: Thomas Jefferson Memorial Association, 1904), 11: 118–19.

[17] Records of the President's Commission on Economy and Efficiency, 1905–13, Records of the Bureau of the Budget, Record Group 51, National Archives Building.

[18] W. B. Proudfoot, *The Origin of Stencil Duplicating* (London: Hutchinson and Co., 1972), p. 24.

the bottom sheet was sent; the thin tissue on top, on which the writing appeared in reverse, was retained. The writing on the retained copy could be read through the thin paper. During the first half of the nineteeth century, other manufacturers both in the United States and Great Britain produced manifold writers and styluses similar to Wedgwood's. During the Civil War, Ulysses Grant used a manifold writer which is preserved among the holdings of Princeton University.[19]

The concept of the letter-copying press was well known by the start of the nineteenth century. In 1780 James Watt, inventor of the steam engine, patented a portable copying machine which used this idea. Watt's device, which was sold both in England and France,[20] included a recipe for special ink to be used in writing the document to be copied. The completed document was placed next to a dampened sheet of tissue paper and both were sandwiched between sheets of oiled paper and placed in a press. After pressing, the writing on the original was offset on the tissue in reverse and could be read through the thin paper. During the nineteenth century, letterpresses of many forms were developed including presses that exerted their pressure through levers, portable rolled versions, and screw-type presses.

With the development in 1856 of aniline dyes for copying inks and, beginning shortly after the Civil War, the import of thin, highly absorbent Japanese paper, the letterpress became widely used. After the Civil War, many copies were made in letterpress books of numbered tissues. The tissue to be used for a copy was dampened with water by brush or soaked cloth. Sheets of oiled paper were placed on either side of the tissue, and the letter to be copied was placed under the tissue. By means of this technique, a number of documents could be copied at a single time. Even typewritten materials were frequently copied in presses, despite the availability of carbon paper. The use of the copy press continued well into the twentieth century.

After this brief review of American writing tools and copying techniques, we, as archivists, should consider why this information is valuable to us. The writing tools used must inevitably be part of the physical evidence presented by historical documents. On close examination and with some good fortune this evidence even may help date a document within the general context of the development of the steel dip pen, ballpoint, or typewriter, or the use of a distinctive form of duplication. Above all, though, knowledge of the development and use of American writing tools adds depth and sensitivity to our analysis and understanding of historic records.

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[19] Lloyd A. Dunlap, "The Grant-Lee Surrender Correspondence: Some Notes and Queries," *Manuscripts* 21 (Spring 1969): 78–91.

[20] A French version of Watt's instruction manual is among holdings of the Library of Congress.

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