Samuel Finley Breese MORSE (1791-1872)

His life and his telegraph

INTRODUCTION

When the name Morse is mentioned, many (mainly older?) people still think of the Morse alphabet. The readers of this article/chapter will certainly also know that he was the inventor of the 'Morse telegraph'; perhaps also that he started his career as a painter. But what kind of a career? Well, Finley Morse (in his youth he was addressed as Finley, not Samuel) was a gifted portrait painter and became famous for it. He portrayed many authorities, including two Presidents of America. It was only in the second period of his life (when he was 41!) that he concentrated on telegraphy. I will therefore present here in PART 1 more details about his first less-known, or even unknown, activity period.

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Needless to say that I have not experienced that period myself and have therefore had to consult existing sources, especially for PART 1. The biography of Kenneth Silverman [1], a book of 503 pages thick, has been an excellent and very detailed guide. Also [2], Christian Brauner's book was very useful. Add to that some excellent websites [9] and [10] and I could get started. I did also consult other books from my library and various websites, with a special thanks to Wikipedia.

As usual, PART 2 is devoted to some technology and illustrated with photographs of apparatus that is – or has been- in my collection (unless stated otherwise).

PART 1: HIS LIFE

1.1. Birth and Education

Samuel Finley Breese Morse, 'Finley' as the family called him, was born in Charlestown, Massachusetts on 27 April **1791**. He was the first child of the pastor Jedidiah Morse, who was also a geographer, and his wife Elizabeth Ann Finley Breese. During their marriage they had eight more children, but only two survived. His father was a great preacher of the Calvinist faith. He published atlases, school texts, arranged travel guides, and other geographical works. He even arranged for British editions. And so he became a national figure As the eighteenth century closed, like most other Congregationalist clergy, he viewed with growing alarm French interference in American affairs. He believed in the Federalist support of an alliance with Britain and a strong central government. All of this created a climate for the young Finley that had some importance in his later life.

Samuel F. B. Morse, *Self Portrait* (ca. 1809)
(National Academy of Design)

In **1799**, now eight years old, Finley was enrolled at 'Phillips Academy' in Andover (Mass.), where classical languages, mathematics and religion were the main subjects. In taking drawing as one of his subjects, at about the age of eleven, he discovered a talent for art. His talent developed quickly. By the age of twelve he was creating miniatures: small portraits painted on slices of ivory.

After attending this preparatory school (**1805**), he went on to Yale College. By then he was fourteen and a half, while most entering students were about sixteen. He was not a good student in the typical subjects but was drawn to science. He attended the chemistry classes of Professor Benjamin Silliman who demonstrated the Voltaic pile and the Cruikshank battery. And he spent one school vacation in the college's "Philosophical Chamber" (the lab) assisting a tutor in 'static' electricity experiments. He also attended the demonstrations given by Professor Jeremiah Day. But he developed literary interest as well.

He continued to paint, too, more seriously than before, mainly watercolour profiles on paper and miniatures on ivory which he sold for a couple of dollars.

1.2. The Painter - a chronological overview [9]

1800: Alessandro Volta of Italy created the "voltaic pile," a battery that produces a reliable, steady current of electricity.

He graduated from Yale in **1810** and decided to be a painter. His dream was to study in Boston with the famous American painter Washington Allston. That didn't go through as his parents were opposed to it. But Allston, after having seen the quality of Samuel's work and his talents, finally convinced his parents and he invited the young man to accompany him to London for three years of study, starting in July 1**811**. That was obviously a milestone in Samuel's carrier as a painter. There he perfected his painting techniques and by the end of 1811, he gained admittance to the Royal Academy. At the Academy, he was moved by the art of the Renaissance and paid close attention to the works of Michelangelo and Raphael.

He left England in late **1815**, to return to the United States, opened an art studio in Boston and began his full-time career as a painter.

In **1819** the city of Charleston commissioned Morse to paint a portrait of President James Monroe (painted in 1820).

***1820**: The Danish physicist Hans Christian Oersted discovered that electric current in a wire generates a magnetic field that can deflect a compass needle. This property will eventually be used in the design of some electromagnetic telegraph systems.*

In **1823** Morse finished an eighteen-month project to paint 'The House of Representatives', an oversize scene of the Rotunda of the Capitol in Washington, D.C. The same year he opened an art-studio in New York City.

***1825**: William Sturgeon invented the electromagnet, which will be a key component of the telegraph.*

His commissions for a portrait of the Marquis de Lafayette (**1825**) engaged his sense of democratic nationalism. He was honoured to paint this leading French supporter of the American Revolution.

In **1826**, he helped found the 'National Academy of the Arts of Design' in New York City (which had been established in reaction to the conservative American Academy of Fine Arts). He served as the Academy's President from 1826 to 1845 and again from 1861 to 1862.

1827: Morse helped launching the 'New York Journal of Commerce' and published 'Academics of Art'. Professor James Dana of Columbia College gave a series of lectures on electricity and electromagnetism at the New York Athenaeum, where Morse also lectured. Through their friendship, Morse became more familiar with the properties of 'dynamic' electricity.

In November **1829**, leaving his children in the care of other family members, Samuel Morse set sail for Europe to improve his painting skills. He visited Lafayette in Paris and painted in the Vatican galleries in Rome. During the next three years, he visited numerous art collections in Italy, Switzerland and France so as to study the work of the Old Masters and other painters. He also painted landscapes. Amongst many others he painted miniature copies of a lot of the Louvre's famous paintings on a single canvas which he entitled ‘The Gallery of the Louvre’. He completed the work upon his return to the United States.

1831:*The American scientist Joseph Henry announced his discovery of a powerful electro-magnet made from many layers of insulated wire. Demonstrating how such a magnet can be used in sending electric signals over long distances, he suggested the possibility of the telegraph.*

In **1832**, being back in America, Morse was appointed the professor of painting and sculpture at the University of the City of New York (now New York University).

I want to note here at the end of this chapter about his life as a painter, that I learned (out of his biography in [1]) that Samuel Morse in this first part of his professional life had many periods where he lived in poverty, was many a time in serious debt, had many periods of depression, many times felt hopeless and was also often ill.

Before moving to the next period in his professional life I will show below some of his most famous paintings.

* Self-portrait of Morse in 1812 (National Portrait Gallery)

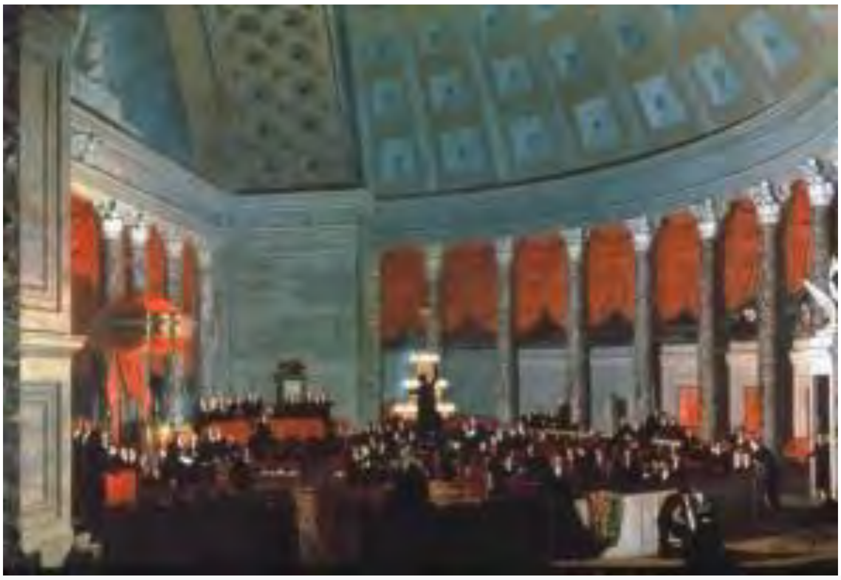
* The Dying Hercules, Morse’s early masterpiece

In 1813 he decided to submit a painting for the exhibition of the Royal Academy. He began to make a two-foot long plaster model of the famous Hercules, his first attempt at sculpture. Then he used this sculpture as model for a painting of the same subject. Both the sculpture and the painting (six by eight feet = 1,83 m by 2,44) made great impression and he was awarded with the golden medal

* Portrait of James Monroe, 5th President of the United States (1819)

Amongst many other well-known people he painted the then former President John Adams as well as the then actual President James Monroe.

* The House of Representatives 1821-1823



In 1821 he conceived a bold new painting, the most novel and complex he had ever attempted: painting the monumental interior of the House of Representatives, newly rebuilt since the British torched the Capitol in 1814. The great canvas would include portraits of all the sixty-seven House members. The overall dimensions are: 86 7/8 × 130 5/8 in. = c. 2.2 m × 3.3 m. It took him eighteen months.

*Grand Gallery of the Louvre 1831-1833

A tour de force, six feet by nine feet (c. 1.8 by 2.7 meters), it required him to copy in miniature thirty-seven masterpieces. It took him fully fourteen months. It reproduces in miniature paintings from Raphaël, B.E. Murillo, Cl. Lorrain, A. Van Dyck, Rembrandt, D. Teniers II, Veronese, Titian, N. Poussin, P.P. Rubens and other masters like Leonardo da Vinci (see his Mona Lisa > yellow arrow)

I strongly recommend to check:http://www.seattleartmuseum.org/exhibitions/morse > go to ‘A CLOSER LOOK’ and use the magnifying glass!
And have also a look at https://www.youtube.com/watch?v=b_A_mdCrLDQ > a nice movie.

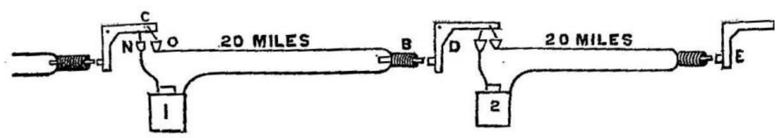
1.3. The invention of his 'Morse telegraph' - a chronological overview

During his voyage home to New York in **1832** on the Sully, Samuel Morse first conceived the idea of the electromagnetic telegraph during his conversations with another passenger, Dr. Charles T. Jackson of Boston, a twenty-eight-year-old physician with a Harvard M.D. Jackson described to him European experiments with electromagnetism. Inspired, Morse wrote ideas for a prototype of an electromagnetic recording telegraph as well as for an appropriate code system in his pocket-size sketchbook (a certified copy of the original has survived and is kept in the Smithsonian Institute).

Being back in America Morse started work on developing the telegraph, and in the Autumn of **1835** he constructed a recording telegraph with a moving paper ribbon and demonstrated it to several friends and acquaintances.

In January **1836**, Morse demonstrated his recording telegraph to **Dr. Leonard Gale**, a professor of science at the same University and a personal friend of the famous Professor **Joseph Henry** of Princeton (a specialist in electro-magnetism…).

Then came the important year **1837**. In that year Morse completed his last paintings and withdrew completely from painting to devote his full attention to the telegraph. And on October he filed a 'caveat' for his 'American Electro Magnetic Telegraph' in order to protect his rights; the patent was obtained in 1840. (A caveat protects the rights and the further development of an invention in awaiting the final decision: the patent). The Commissioner of Patents in Washington was **Henry L. Ellsworth**, a friend and Yale classmate… (that name will come back later).
But Morse had encountered the problem of getting a telegraphic signal to carry over more than a few hundred yards of wire. His breakthrough came from the insights of Professor Leonard Gale.



Together with Professor Gale, they worked out their plans for "electric relays". A relay is a simple electrical configuration, put into the line at a certain distance (tens of miles away from the sender) with a receiving electro-magnet that is sensitive enough to detect a weak current and that then closes a switch. This switch then inserts a local battery that in its turn feeds the next further section of the line. So this use of "repeaters" permitted a message to be sent to great distances, which was previously not feasible.
This was the great 'technological breakthrough that Morse had been seeking. Later on, the use of relays for long distance transmission was of prime importance in the defence of his patent. For his assistance, the science professor Gale became part owner of the telegraph rights.
However, Morse knew no more of toolmaking than of electrical science. Having turned to Gale for help with batteries and electro-magnets, he now enlisted an experienced machinist, one of his former pupils at the University, a recent graduate named **Alfred Vail**. And, very importantly, Vail's family owned a foundry and machine shop, the "Speedwell Iron Works" in Morristown, New Jersey. There Morse and Alfred Vail did most of the research and development. Alfred agreed to take on the job of refining Morse's machinery, in exchange for a share of the profits. Morse granted Vail a one-fourth financial interest in the apparatus in the US, and a quarter in the foreign rights. Morse also valued the fact that Alfred's father, **Stephen Vail**, (who was also a lay judge of the Court of Common Pleas), offered to pay for building the apparatus to be shown to Congress.
Vail streamlined the register. He got rid of the canvas stretcher and pendulum (see in 2.3), and reinstalled the recording apparatus on an within a flat box (as can be seen in further on in 1.4 and 2.4. of the 1840 patent drawings, sheet 3).

Early **1838** Morse made many demonstrations of his telegraph: to his friends in his university studio, before a scientific committee at the Philadelphia's Franklin Institute, before the U.S. House of Representatives ‘Committee on Commerce’ and, on 21February, to the President Martin Van Buren and his cabinet.
In March, Congressman and a lawyer **Francis O. J..Smith**, the committee chairman, was himself so keen on the telegraph’s possibilities that he asked Morse to take him in as a partner. He suggested that they go to Europe together and apply for foreign patents. In March Morse drew up new articles of agreement embracing himself, Francis Smith, Alfred Vail, and Prof. Leonard Gale.
On 6 April, Francis Smith sponsored a bill in Congress to appropriate $30,000 to build a fifty-mile telegraph line, but the bill was not acted upon. Smith concealed his part-interest in the telegraph and served out his full term of office.
In May, Morse traveled to Europe in order to secure patent rights for his electromagnetic telegraph in England, France, and Russia. He was only successful in France where he got a ‘Brevet d’Invention’.

In June **1840** he was granted a United States patent for his telegraph.(see 1.4.).

In October **1842**, Samuel Morse experiments with underwater transmissions. Two miles of cable was submerged between his battery and Governor's Island in New York Harbor. The signals were sent successfully.
Morse made his last trip to Washington, D.C., in December 1842, stringing wires between two committee rooms in the Capitol, and sent messages back and forth to demonstrate his telegraph system.

On 3 March **1843**, Congress was convinced and appropriated, $30,000 for construction of an experimental 38-mile (61 km) telegraph line between Washington, D.C., and Baltimore, Maryland, along the right-of-way of the Baltimore and Ohio Railroad.

An impressive demonstration occurred on 1 May **1844**, when news of the nomination of Henry Clay for U.S. President was telegraphed from the party's convention in Baltimore to the Capitol Building in Washington.
Initially, the cable was placed in lead pipes underground, using a machine (drawn by a team of eight mules) designed by Ezra Cornell; when that failed, above-ground poles were used.
And on 24 May 1844, the line was officially opened as Morse sent the now-famous words, "What hath God wrought," from the Supreme Court chamber in the basement of the U.S. Capitol building in Washington, D.C., to the B&O's Mount Clare Railway Depot in Baltimore. Annie Ellsworth chose these words from the Bible (Numbers 23:23). As we have seen above, her father, U.S. Patent Commissioner Henry Leavitt Ellsworth, had championed Morse's invention and had even secured early funding for it.

In the spring of **1845**, Morse selected **Amos Kendall**, a lawyer and former U.S. Postmaster-General, to be his agent. Morse signed an agreement granting him full power to transact all telegraph business. Vail and Gale agree to take on Kendall as their agent as well.
In May, Amos Kendall and Francis Smith created the ***‘Magnetic Telegraph Company’*** to extend the telegraph from Baltimore to Philadelphia and New York. It was the nation’s first telegraph company.
By the summer, Morse returned to Europe to promote and secure his telegraph rights.
In the first place, he targeted England and France, but it turned out to be unproductive, just like it had been six years before.
During that time Vail published a two-hundred-page monograph, entitled “The American Electro-Magnetic Telegraph: with the reports…” (see [3]). The relationship between Morse and Vail had deteriorated lately, the main reason being that Morse was constantly trying to minimize Vail's share in his invention. Morse tried to prevent the publication as he was afraid that his reputation would be damaged. But the book was published anyway and was indeed not to the advantage of Morse.
Also Prof. Henry had grown angry at Morse for the same reason.

1846. New York is now connected to Washington, D.C., Boston, and Buffalo. Different telegraph companies begin to appear, sometimes building competing lines side by side.

1846-1848. As a result of the enormous expansion of the telegraph network in the US, a lot of money was earned. A consequence of this was the greediness of Morse's associates which resulted in a lot of malpractices. They set up firms, negotiated with competitors, told untruths about him, had fights between themselves, etc.
And over the years, new telegraph devices were introduced. There was the telegraph of Mr. Royal House (later on an inspiration for David Hughes), the one from Henley (with magneto), the Bakewell apparatus (precursor of the 'facsimile').
Morse's patent claims were threatened, especially by the telegraph companies of Henry O'Reilly. O'Reilly was the man who, years before, wanted the term 'telegraph' and 'telegraphy' changed to 'morsograph' and 'morsography'. Amongst others this led to a trial in court between Samuel Morse and O'Reilly. The trial started on 24 August 1848 in Frankfort, the state capital of Kentucky. Morse came out of it victorious.
But he had to fight other cases like the Bain v. Morse and the Morse v. Smith ones. Even Dr. Charles. Jackson, Morse's acquaintance from the 1832 Sully voyage, claimed to be the inventor of the telegraph.

Telegraphic lines rapidly spread throughout the United States in the next few years, with 12,000 miles (192,000 km) of wire laid by **1850**.

The Morse telegraphic apparatus was officially adopted as the standard for European telegraphy in **1851**. Only the United Kingdom (with its extensive overseas empire) kept the needle telegraph of Cooke and Wheatstone. But even then, the Morse system was steadily gaining ground due to its evident advantages. Belgium, which has started with the Cooke & Wheatstone needle telegraphs in 1845/46, gradually switched over to Morse telegraphs in the 1850s. The same happened in France where they were still using their own invented telegraphs: the Foy & Breguet' needle' one and the Breguet 'dial' one.

In **1853** a second, more complex cycle of lawsuits disturbed Morse's pleasure in his new marriage with Sarah Griswold (10 August 1848). It started late that year at the Unites States Supreme Court and became known as "the Great Telegraph Patent Case", also called the "O'Reilly v. Morse" (see [12]) The nuanced judgment came in February **1854**. In favour of Morse were the statements that it upheld Morse's patent claims for the telegraph, that U.S. companies that use his system should begin to pay Morse royalties, and that his telegraph patent was extended for seven years. On the other hand, his request to have the exclusive right on every future electric telegraph was considered as "too broad, inhibiting improvement and innovation" and declared it illegal and void.

Morse with a "morse-register" in 1857

1856: Many of the telegraph companies united to form the '*Western Union Telegraph Company'*.

On 1 September **1858**, the governments of ten European countries awarded Morse 40,000.00 French francs for his invention of the telegraph.
Also in 1858, Morse introduced wired communication to Latin America when he established a telegraph system in Puerto Rico, then a Spanish Colony.

1859: The Magnetic Telegraph Company became a part of Cyrus Field's *'American Telegraph Company'*.

In **1861** The telegraph was used by both the Union and Confederate forces during the civil war. Stringing up telegraph wires became an important part of military operations.

In **1865** the International Telegraph Union (ITU) was founded to set rules and standards for the telegraph industry.

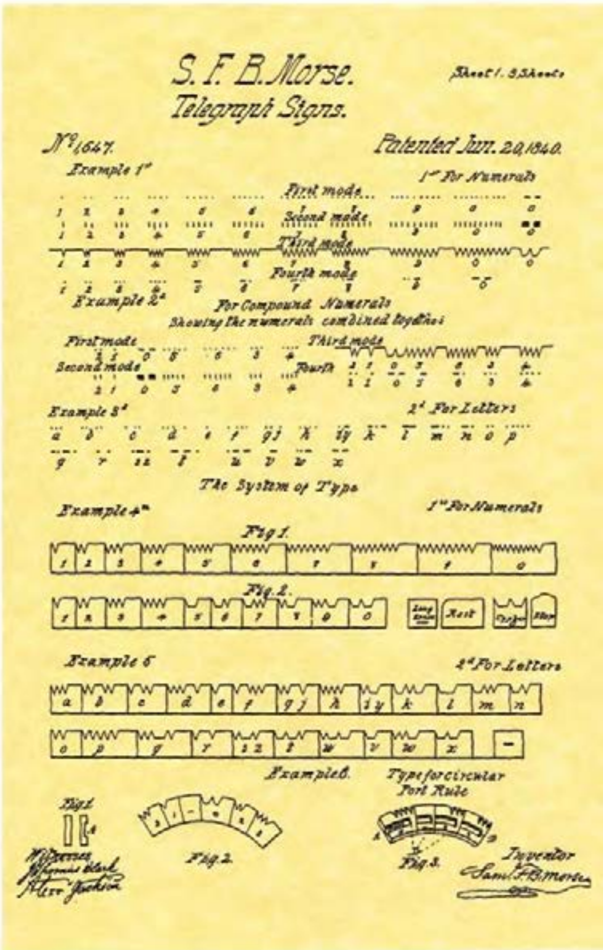
1.4. His patents

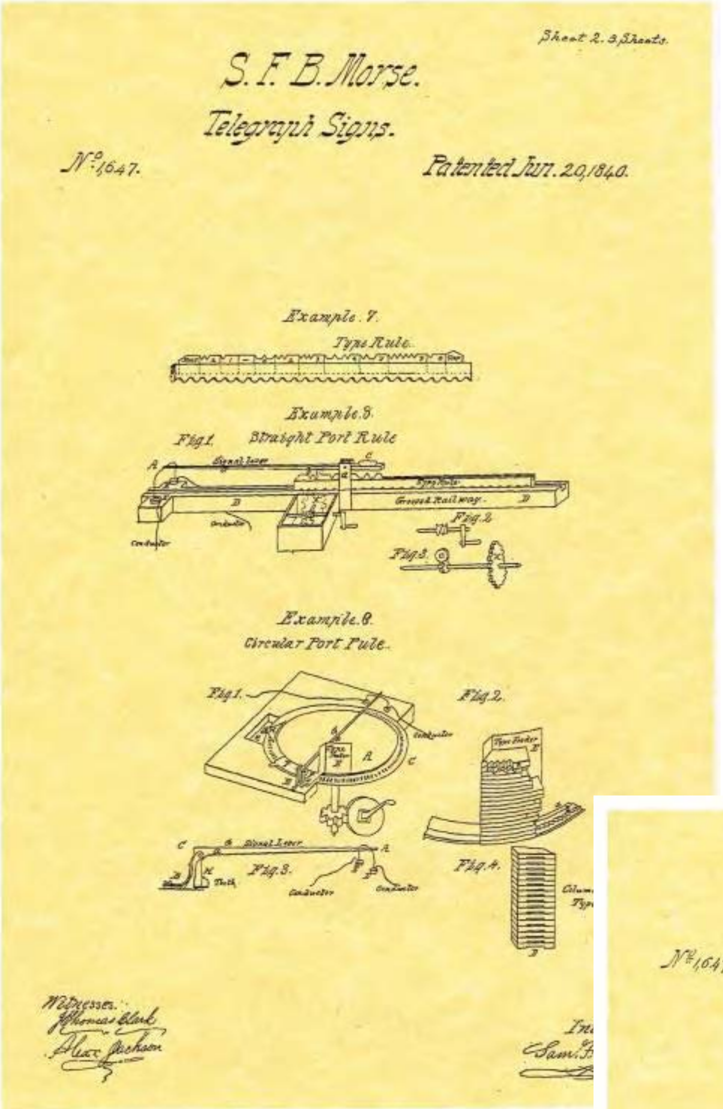
* US Patent 1,647: “Improvement in the mode of communicating information by signals by the application of electro-magnetism”, 20 June 1840
 -Reissue #79, 15 January 1846
 -Reissue #117, 13 June 1848
*US Patent 3,316: “Method of introducing wire into metallic pipes”, 5 October 1843
* US Patent 4,453: “Improvement in electro-magnetic telegraphs”, 11 April 1846
 -Reissue #118, 13 June 1848
* US Patent 6,420: “Improvement in electric telegraphs”, 1 May 1849

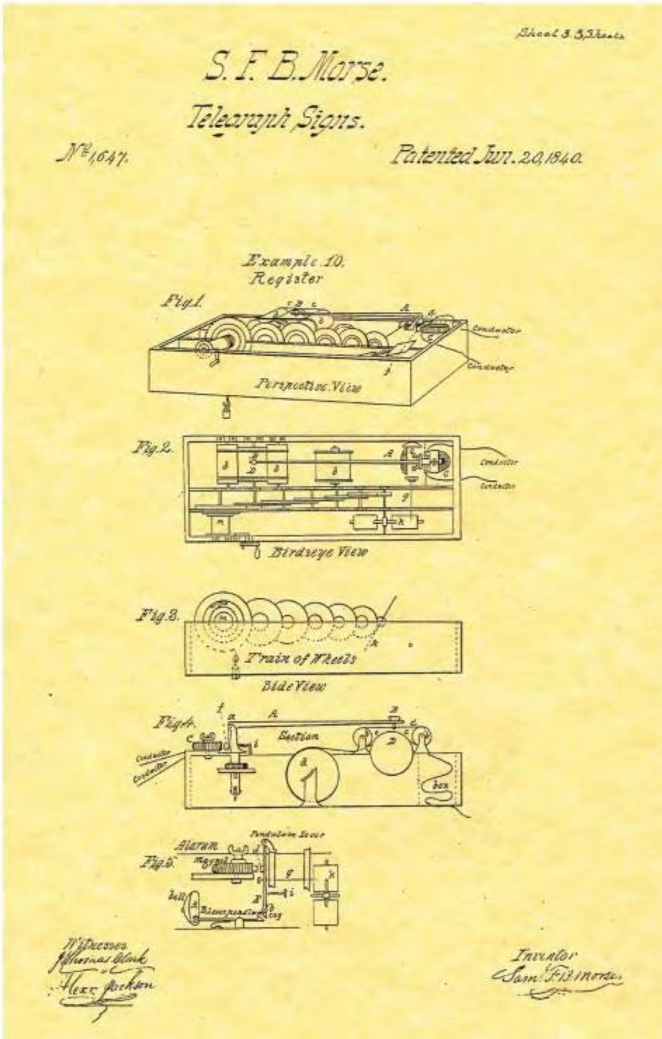
Here you see the three drawing sheets of the first patent. Sheet 1 shows the different ways of coding (for numerals and letters); sheet 2 the two models of the ‘port rule’ (linear and circular); and sheet 3 the apparatus. In addition there are six pages with a detailed description.

The original Morse telegraph (of 20 June 1840), submitted with his patent application, is part of the collections of the National Museum of American History at the Smithsonian Institution.

Sheet 1




Sheet 2. 3 Sheets.
S. F. B. Morse.
Telegraph Signs.
No. 1647.
Patented Jun. 20, 1840.
Example. 7.
Type Rule.
Example. 8.
Fig. 1.
Straight Port Rule
Grooved Railway
Fig. 2
Fig. 3.
Conductor
Example. 9.
Circular Port Rule.
Fig. 1.
Fig. 2.
Signal Lever
Fig. 3.
Fig. 4.
Witnesses:


Sheet 3. 3 Sheets.
S. F. B. Morse.
Telegraph Signs.
No. 1647.
Patented Jun. 20, 1840.
Example. 10.
Register
Fig. 1.
Perspective View
Fig. 2.
Birdseye View
Fig. 3.
Train of Wheels
Side View
Fig. 4.
Section
Fig. 5.
Alarum
Pendulum Lever
Witnesses
Inventor

1.5. His Political Views

* Morse was a leader in the anti-Catholic and anti-immigration movement of the mid-19th century.
He wrote numerous letters to the New York Observer (his brother Sidney was the editor at the time) urging people to fight the perceived Catholic menace. These were widely reprinted in other newspapers. Among other claims, he believed that the Austrian government and Catholic aid organizations were subsidizing Catholic immigration to the United States in order to gain control of the country. In 1835 he published his book ‘Foreign Conspiracy Against the Liberties of the United States’ based upon his previous articles. It was a treatise against the political influence of Catholicism. He worked to unite Protestants against Catholic institutions (including schools), wanted to forbid Catholics from holding public office, and promoted changing immigration laws to limit immigration from Catholic countries.
When he visited Rome, he allegedly refused to take his hat off in the presence of the Pope.

* In the spring of **1836** Morse ran unsuccessfully for mayor of New York for a nativist (anti-immigration) party. He received only 1,496 votes.

* **1841** In the spring, he ran again as a nativist candidate for mayor of New York City. A forged letter (fake news ‘avant la lettre’…) appeared in a newspaper announcing that Morse has withdrawn from the election. In the confusion, he received fewer than one hundred votes.

* In the **1850s**, Morse became well known as a defender of slavery, considering it to be sanctioned by God. This was a position held by many Southerners and others. In his treatise "An Argument on the Ethical Position of Slavery," he wrote: “My creed on the subject of slavery is short. Slavery per se is not sin. It is a social condition ordained from the beginning of the world for the wisest purposes, benevolent and disciplinary, by Divine Wisdom. The mere holding of slaves, therefore, is a condition having per se nothing of moral character in it, any more than the being a parent, or employer, or ruler”.

* In **1854** he ran unsuccessfully as a Democratic candidate for Congress in the Poughkeepsie district, New York.

1.6. A few remarkable events.

*A bit of a surprise: Samuel Morse and his brother Sidney patented a flexible piston, man-powered water pump for fire engines. They demonstrated it successfully in **1817**, but it was a commercial failure. Samuel spent the rest of the year painting in Portsmouth, New Hampshire

*Again something somewhat unexpected happened in **1822**. Samuel Morse invented a marble-cutting machine that could carve three-dimensional sculpture in marble or stone. He discovered however that it was not patentable because it infringed on an 1820 design.

*Another remarkable event happened in **1839**. On a subsequent visit to Paris, Morse met **Louis Daguerre**. He became interested in the latter's daguerreotype, the first practical means of photography. Morse wrote a letter to the New York Observer describing the invention, which was published widely in the American press and provided a broad awareness of the new technology. And in 1840 he opened a daguerreotype portrait studio in New York with **John W. Draper**, Professor of Chemistry at New York University who had published several sophisticated scientific papers on the chemical effects of light. Further on Morse taught the process to several others, including the famous **Mathew Brady**, the future Civil War photographer, who later praised his teacher as ”the first successful introducer of this rare art in America”.

*Also less known is the fact that Morse lent his support to **Cyrus West Field**'s ambitious plan to construct the first transoceanic telegraph line. Morse had experimented with underwater telegraph circuits since **1842**. He invested $10,000 in Field's Atlantic Telegraph Company, took a seat on its board of directors, and was appointed honorary "Electrician". In **1856**, Morse traveled to London to help Charles T. Bright and Edward Whitehouse test a 2,000-mile-length of spooled cable.

*Also in **1842** Morse gained sensational publicity, most of it unwelcome, in teaming up with **Samuel Colt**. Colt had received a patent for his famed revolver, the first multi-shot firearm. Colt was experimenting with methods of detonating gunpowder underwater by electricity, in effect creating an arsenal of undersea mines to destroy enemy ships. What interested Morse was to learn how to overcome the difficulties that could arise when working with telegraph lines across the nation’s rivers

1.7. A bit on his family life, later years and death

*Morse married Lucretia Pickering Walker on 29 September **1818**, in Concord, New Hampshire (he was 27 years old, she 16). They had three children: Susan (1819), Charles (1823), and James (1825).

*At the start of February Morse was still busy painting the portrait of general Lafayette. On 7 February **1825**, Morse's wife, Lucretia, died suddenly at age twenty-five. By the time Morse was notified and returned home to New Haven, she has already been buried.

*On 10 August **1848**, he married his second wife, Sarah Elizabeth Griswold, a second cousin twenty-six years his junior. They had four children: Samuel Arthur (1849), Cornelia (1851), William (1853) and Edward (1857).

*In 1**866** Morse sailed with his second wife and their four children to France, where they remained until 1868.

*Morse served as a United States commissioner at the Paris Universal Exposition in **1867**.

* At the evening of the day that a statue of Morse was unveiled in Central Park in New York City, 10 June **1871**, a dinner was organized to further honour Morse. A telegraph connection had been set upon a table beforehand. At 9:00 p.m. it was announced that the register was connected to the principal cities and towns of the United States and Canada, and that Professor Morse was to send a message, simultaneously to all of them. A Western Union telegrapher, was then escorted to the table to send the body of Professor Morse's message. The auditorium went silent as she sent:

" Greeting and thanks to the Telegraph fraternity throughout the world. Glory to God in the Highest, on Earth Peace, Goodwill to men." Then Morse took his seat and as he reached for the key, a complete stillness took place and, slowly sent his signature : *S F B MORSE*. It was his last telegram, a "farewell" message around the world from New York.

*Less than a year later he died in New York City (aged 80) on 2 April **1872**, and was interred at Green-Wood Cemetery in Brooklyn, New York.

* Morse gave large sums to charity. He also became interested in the relationship of science and religion and provided the funds to establish a lectureship on "the relation of the Bible to the Sciences". Though he was

rarely awarded any royalties for the later uses and implementations of his inventions, he was able to live comfortably.

1.8. Recognition, honours and awards

* In **1844** the New York SUN proclaimed the telegraph "… the greatest revolution of modern times and indeed of all time, for the amelioration of Society…

* Morse was elected an Associate Fellow of the American Academy of Arts and Sciences in **1849**.

* The Morse telegraph was officially adopted as the standard for European telegraphy in **1851**.

* Assisted by the American ambassador in Paris, the governments of Europe were approached about their long neglect of Morse while their countries were using his invention. There was a widespread recognition that something must be done, and in **1858** Morse was awarded the sum of 400,000 French francs by the governments of France, Austria, Belgium, the Netherlands, Piedmont, Russia, Sweden, Tuscany, and Turkey, each of which contributed a share according to the number of Morse instruments in use in each country. France had then 462 Morse instruments in service, Belgium 52, the Netherlands 72, Piedmont 73, Sweden 191, Turkey 69, Austria 224, Russia 110,…
England, without installed Morse receivers did, of course, not participate in this action.

Portrait of Samuel F. B. Morse taken by Mathew Brady in **1866**.

* Morse had honours heaped upon him: Grand Cross of the Order of Isabella the Catholic (Spain); Chevalier of the Legion of Honour (by Napoleon III of France); Gold Medals for scientific merit by Prussia and Austria; Order of the Tower and Sword (Portugal); Order of the Dannebrog (Denmark); Order of Saints Maurice and Lazarus (Italy); the Sultan of Turkey presented him with a diamond-encrusted Order of the Glory from Turkey; a.s.o.… He was made an honourary member of numerous scientific, artistic and academic institutions both in America and Europe including, strangely, the Archaeological Society of Belgium. I think that this had to do with the friendship and mutual respect between Samuel Morse and Adolphe Quetelet. Quetelet was a member of the Royal Society and founded several societies; one of them was the Brussels Observatory where he was the first director. His scientific research encompassed a wide range of different scientific disciplines and he was a highly respected international authority. In 1970, the International Astronomical Union attributed the name of Quetelet to a lunar crater. The reputation of Samuel Morse's father, the 'geologist', was well known in Europe and certainly also by Quetelet. As Quetelet played a prime roll in the set-up and the expansion of the Belgian telegraph network, he was well aware of the invention of Samuel Morse. So I suppose that Quetelet has acted as Samuel Morse's promoter to get him this honourary title here in Belgium.

* Despite honours and financial awards received from foreign countries, there was no such recognition in the U.S. until he neared the end of his life when on 10 June **1871**, a bronze statue was unveiled in Central Park, New York City. The funds were primarily raised by the telegraph community. The list of contributors

was nearly sixty feet long. Donations were made in amounts ranging from 25 cents to 25 dollars, but the bulk were donations of less than 5 dollars made by individual telegraphers.

* An engraved portrait of Morse appeared on the reverse side of the United States two-dollar bill silver certificate series of **1896**.

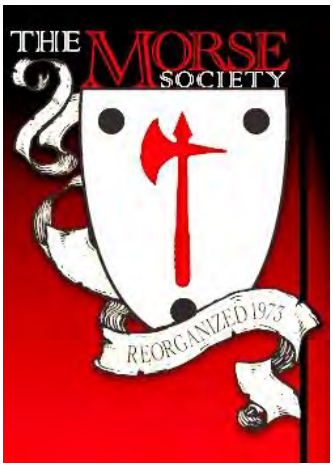
* A 'blue plaque' was erected to commemorate him at 141 Cleveland Street, London, where he lived from 1812 to 1815.

*Morse was honoured on the US Famous Americans Series postal issue of **1940**.

*In **1975**, Morse was inducted into the National Inventors Hall of Fame.

* Morse's telegraph was recognized as an IEEE Milestone in **1988**.

* On 1 April **2012**, Google announced the release of "Gmail Tap", an April Fools' Day joke that allowed users to use Morse Code to send text from their mobile phones. Morse's great-great-grandnephew Reed Morse -a Google engineer- was instrumental in the prank, which became a real product.



* The surname Morse was first found in Gloucestershire where, conjecturally being of Flemish origin, they were one of the many settlers who were invited into England to improve the industrial capabilities of the nation. Is your name Morse (or Moss), then quickly surf to https://morsesociety.org/about.php

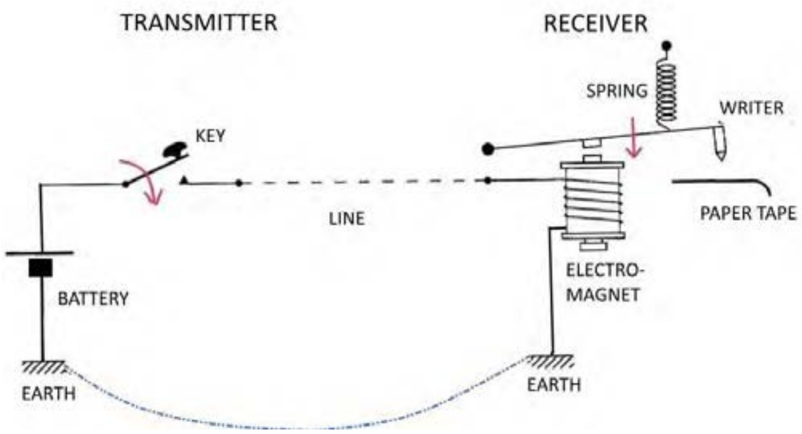
Coat of Arms

Moto: In Deo non armis fido (In God we trust, not weapons)

PART 2 HIS APPARATUS

2.1. Working principles

2.1.1. The basic connection



Non-technical readers have to know what an electro-magnet is.
It is a soft-iron rod on which a thin isolated copper wire is wound. Soft iron is a special alloy of iron that gets magnetised as long as the current is present in the nearby electric wires, but loses it when there is no current. If now an electric current (from a battery) flows through those wire windings, then, and only as long as that current is present, the rod will behave like a magnet. And all that time it will be able to attract metal. Famous names linked with electromagnetism in the 1820-1835 period are André-Marie Ampère and François Arago (FR) - Joseph Henry (U.S.) - William Sturgeon and Michael Faraday (U.K.)

The electrical circuit is made by connecting all elements "in series". On the transmitting side these are the battery and the signal key (in fact an "on-off" switch), then the telegraph line (one wire) and which is then connected on the receiving side to the "input" of the electro-magnet of the receiver.

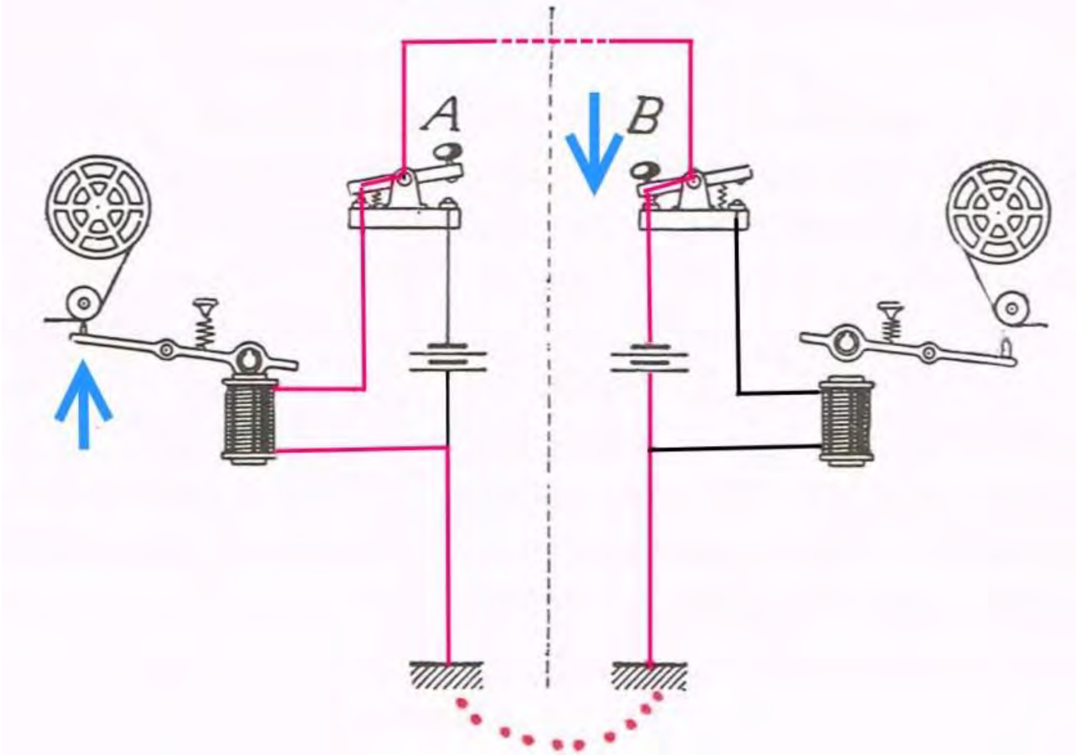
In order to close the electrical circuit, a wire must now normally run from the "output" of the electro-magnet to the transmitter, namely to the second connection of the battery. But since the earth is a very good conductor, that "return" wire can be replaced by the earth (discovered by Carl A. Steinheil in the late 1830's – probably 1838) . This is done by connecting the second pole of the battery on the transmitting side and the "output" of the electro-magnet on site with the earth.
This grounding was usually made by burying a metal plate and connecting it with a metal wire to the second connection of the battery respectively the electromagnet.

If one presses the signal key ("switch closed") then the electrical circuit (the loop) is closed and the battery current will flow through the electro-magnet and via the earth connection back to the battery. The electro-magnet thus becomes magnetised and thereby pulls down the writing pen so that a print is placed on the paper tape. When the current is interrupted, the pen is at rest and is pulled upwards by the spring.

The paper tape is pulled forward by a spring motor (not shown in the above diagram)

Depending on whether the sender is pushing his signal key for a short or a somewhat longer time, short lines (morse dots) or longer lines (dashes) are printed on or, in the early years, scratched in the paper tape.

2.1.2. Set up between two stations

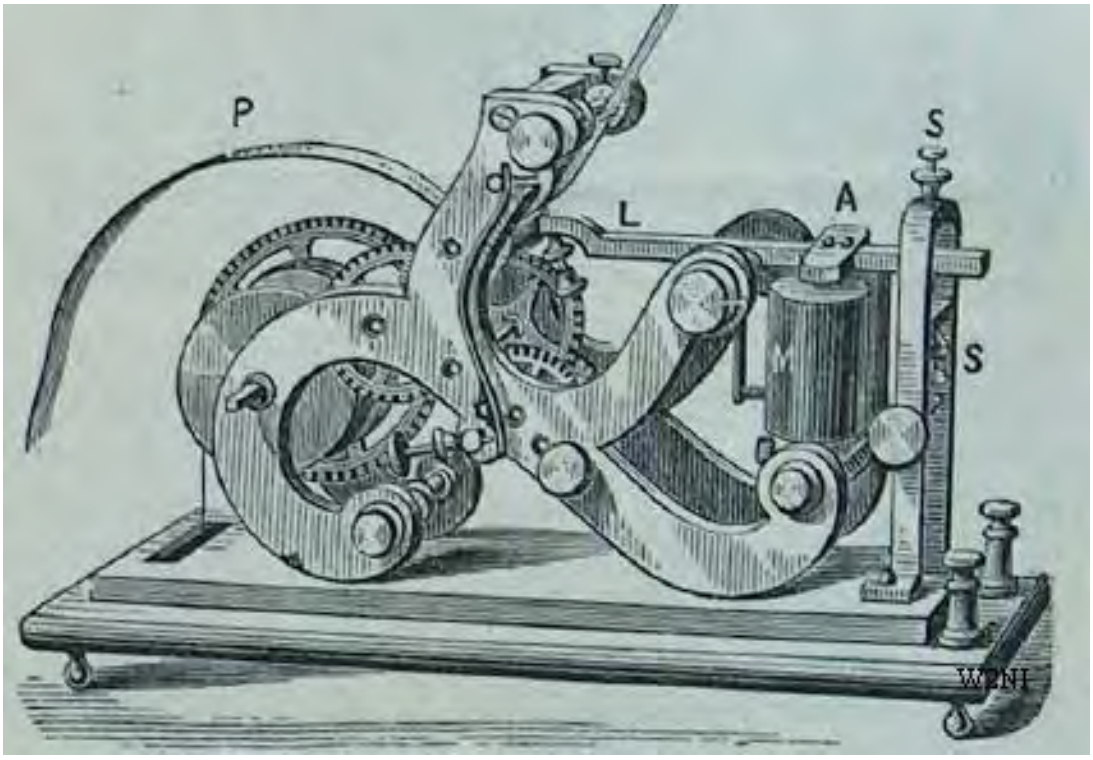


Here it is important to note that the key has two positions. In the rest position (A) the key is untouched and is making a connection with the electro-magnet of his receiver. In this way A is ready to receive the Morse signals from his opposite number; he is in 'receiver' mode. B acts as the transmitter. He can send current impulses from his battery over the line by pushing the knob of his key down. In that position he disconnects his electro-magnet from the circuit and instead connects his local battery to the line. As long as he pushes down the key (for a short time = morse dot, for a somewhat longer time = morse dash) the electrical current flows over the line to his correspondent where it will act upon the electro-magnet. This brings the writing arm with the 'pen' upwards where it leaves a mark, short or long, on the paper tape. The electric circuit described here is drawn in red. The circuit is completed (closed) via the earth.

This is called a 'semi-duplex' (then also called 'diplex') circuit: the two stations can alternatively send messages to each other over one line. (The first drawing showed a 'simplex' circuit i.e. transmission in one direction.)

2.1.3. How does a register work.

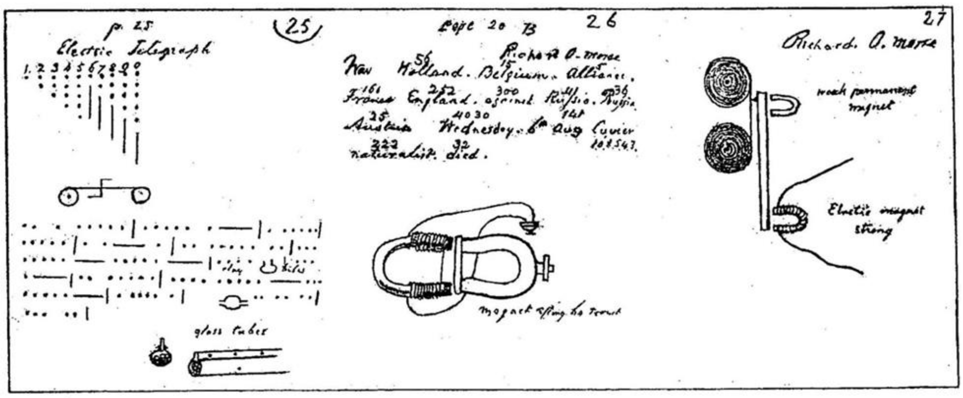
Let's have a look at a typical American register from the 1850s [11.1.].



The Register or Recorder consists of a train of gearing, deriving its power from a weight or coiled spring, which serves to carry a continuous strip of soft paper P three-quarters of an inch in width slowly forward between two cylinders. On the upper cylinder there is a small groove, in close proximity and opposite to which is an indenting point upon the end of the lever L, actuated by the electro-magnet. The passage of a short pulse over the line and through the coils of wire surrounding the iron cores causes the latter to become magnetised, and the iron armature A of the lever is thus attracted. The indenting point upon the other end of the lever is brought in contact with the moving strip of paper, pressing it into the groove and thus recording a dot. If a long pulse is transmitted, the armature remains attracted to the cores of the magnet for a longer time, and the indenting point makes a long indentation owing to the moving of the paper when the lever is attracted. This long indentation is called a dash, and by a combination of one or more of these characters a distinctive signal is given for each letter of the alphabet. [I see the table of US vs International Morse Code is further on in the article.]

2.2. Morse Code

* Shall we say the **Morse** code**,** or shall we say the **Vail** code?. Alfred Vail and Samuel Morse collaborated in the invention of Morse code. A controversy exists over the role of each in the invention.
The argument for Vail being the original inventor is laid out by several scholars.
The argument offered by supporters of Morse claims that Morse originally devised a cipher code similar to that used in existing semaphore line telegraphs, by which words were assigned three- or four-digit numbers and entered into a codebook. The sending operator converted words to these number groups and the receiving operator converted them back to words using this codebook.
Morse spent several months compiling this code dictionary. It is said by Morse supporters that Vail, in public and private writings, never claimed the code for himself. According to one researcher, in a February 1838 letter to his father, Judge Stephen Vail, Alfred wrote, "Professor Morse has invented a new plan of an alphabet, and has thrown aside the Dictionaries." In an 1845 book Vail wrote describing Morse's telegraph, he also attributed the code to Morse.
And when I first saw Morse's sketch in his notebook from 1832 (here below) , then I noticed immediately a kind of Morse coding at the left hand side.



Reproduction from Morse's notebook, showing his original code
Source: Morse, 'Samuel Morse: letters and papers', 1914

To increase the efficiency of encoding, Morse code was designed so that the length of each symbol is approximately inverse to the frequency of occurrence in text of the English language character that it represents. Thus the most common letter in English, the letter "E", has the shortest code: a single dot.

In its original implementation, the Morse Code specification included the following, rather complicated, symbols and agreements:

1. short mark or dot (●)
2. longer mark or dash (▬)
3. a longer internal gap used in C, O, R, Y, Z and &)
4. "long dash" (▬▬, the letter L)
5. even longer dash (▬▬▬, the numeral 0)

* The **Gerke** code was adopted as a standard for transmission over cables by the Austro-German Telegraph Union (which included many central European states) at a conference in 1851. Friedrich Gerke perceived the disadvantages of the American Morse code and changed nearly half of it. In his system there are only two symbols: the short 'dot' and the longer 'dash'.

A word about Gerke. By request of the Hamburg Senator Carl Möhring, the Americans William and Charles Robinson demonstrated their electrical Morse telegraph in Germany. Recognizing the great advantages of the new technology, Gerke started a regular telegraph service on 15 July 1848 between Hamburg and Cuxhaven, which for the first time in Europe used Morse code on landlines.

*** International**. The Gerke code was adopted and in 1865, be it somewhat adapted, by a convention of the International Telegraph Union in Paris. It was first known as "Continental Morse," although as its use spread it also became known as "International Morse." At this point the original Morse Code started to be called American Morse, to differentiate between the two main standards.

Comparison of American and International Morse

American (Railroad) vs. International Morse (similar codes highighted)

Letter	International Code	American Morse	Letter	International Code	American Morse	Digit	International Code	American Morse
A	.-	.-	N	-.	-.	0	-----	—
B	-...	-...	O	---	. .	1	.----	.--.
C	-.-.	.. .	P	.--.	.....	2	..---	..-..
D	-..	-..	Q	--.-	..-.	3	...--	...-.
E	.	.	R	.-.	. ..	4	....-	....-
F	..-.	.-.	S	...	...	5	.....	---
G	--.	--.	T	-	-	6	-....	......
H	....	....	U	..-	..-	7	--...	--..
I	..	..	V	...-	...-	8	---..	-....
J	.---	-.-.	W	.--	.--	9	----.	-..-
K	-.-	-.-	X	-..-	.-..			
L	.-..	—	Y	-.--	.. ..			
M	--	--	Z	--..	... .			

Common punctuation

Symbol	International Code	American Morse[6]	Symbol	International Code	American Morse[6]
Period [.]	.-.-.-	..--..	Apostrophe [']	.----.	..-. .-.. (QX)
Comma [,]	--..--	.-.-	Slash [/]	-..-.	..- - (UT)
Question mark [?]	..--..	-..-.	Hyphen [-]	-....-	.... .-.. (HX)
Exclamation mark [!]	-.-.--	---.	Parenthesis (open) [(]	-.--.	..... -. (PN)[note 1]
Ampersand [&]	.-...[note 2]	. ...[note 3]	Parenthesis (close) [)]	-.--.-	.... (PII)[note 1]
Paragraph break	-...-	----[note 3]	Quotation mark (open) ["]	.-..-.	..-. -. (QN)
Semicolon [;]	-.-.-.	... .. (SI)[note 4]	Quotation mark (close) ["]	.-..-.	..-. -.-. (QJ)
Colon [:]	---...	-.- . . (KEE)			

* On 24 May 2004, the 160th anniversary of the first public Morse telegraph transmission, the Radiocommunication Bureau of the International Telecommunication Union (ITU-R) formally added the **@** character to the official Morse character set, using the sequence:
• — — • — • (mnemo: AC: the abbreviation of the French '**a c**ommercial'.
See a lot more special codes and other excellent information via [15].

* Regarding **SOS,** and somewhat more about the Morsecode, see in 3.1...

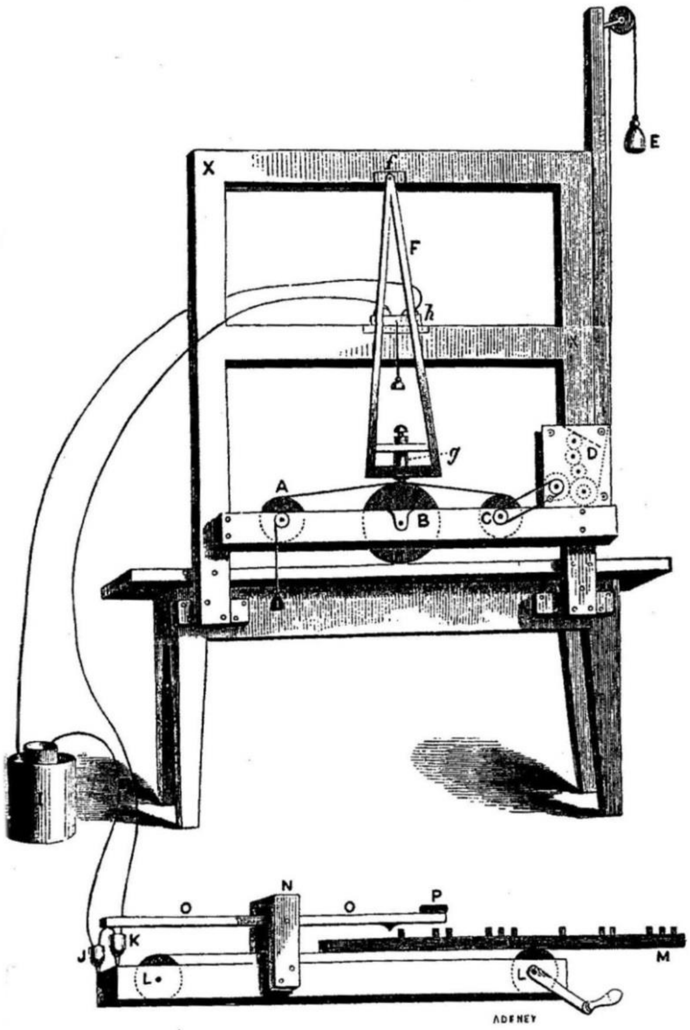
2.3. Morse's first model (1837)

In Part 1 we have seen that Samuel Morse, during his long voyage home from Le Havre to New York in 1832, fell into conversation with Professor Charles C. Jackson on the subject of electricity and magnetism.
It was then that the idea of an electric telegraph first occurred to him.
And during these conversations he came up with the idea to use the electricity to send information over long distances. During that trip he made several drawings about it in his notebook (see the drawing in 2.2.) There you can already see the idea of the coding with dots and stripes.
Back in America this idea did not let him go and he started working on it.
Through experiment he had often changed the design of his apparatus. The one that came out in 1837 was rather crude and considered by some as ridiculous. It consisted of a transmitter, called the port rule and a receiver called the register.

My replica

A postcard from Portugal

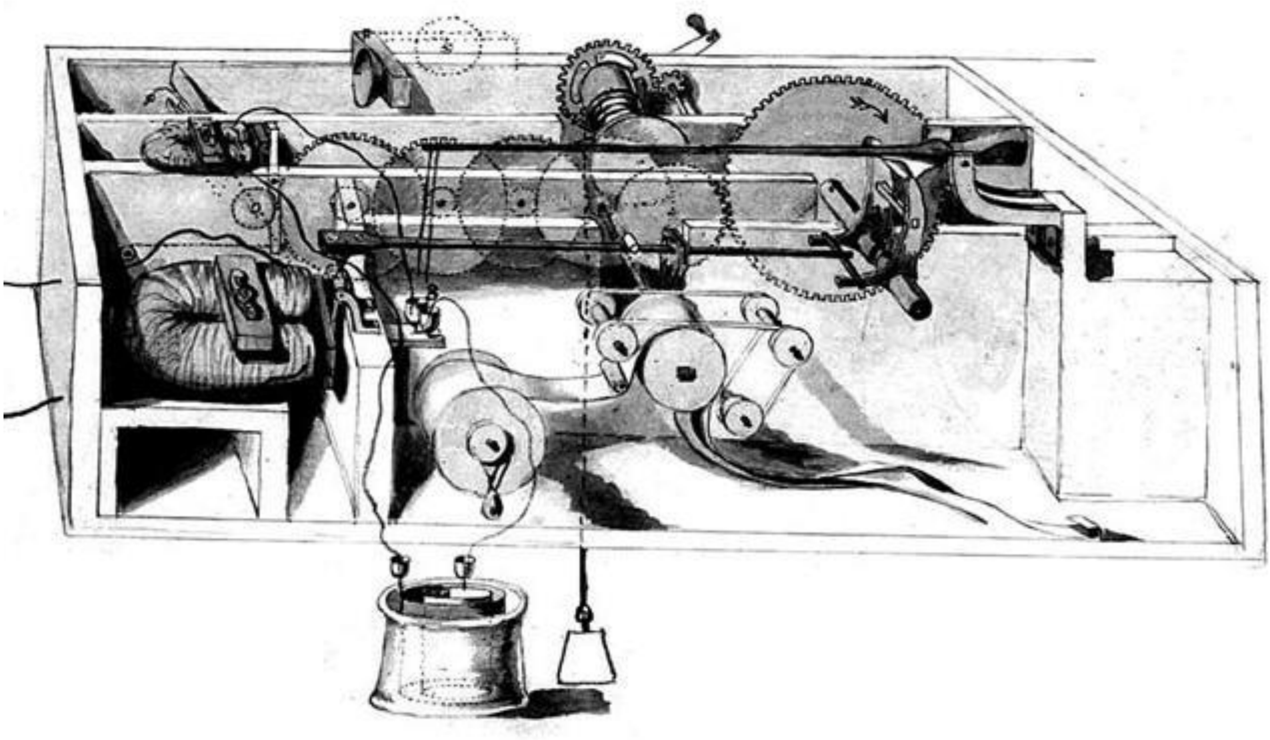
How did it work!?



The port-rule was activated by a printer's composing stick (M), made of wood, and grooved. Flat metal blanks could be set into the groove, each having from one to nine notches. When the crank (L) was turned, the stick glided beneath the balanced lever overhead (O-O). A projecting tooth dropped into the valley or rose to the peaks on the notched metal blanks. At the same time, the two-pointed copper prong at the other end of the lever dipped in and out of the two thimble-size cup of mercury (J,K), which were connected to a battery (I).As the composing stick passed underneath, the see-sawing lever opened and closed an electrical circuit, in a rhythm dictated by the notched blanks.
This circuit activated Morse's register. He built this device in to a wooden frame (X) (otherwise used for stretching canvas?). A clockwork mechanism (D) slowly fed out a ribbon of paper over a drum (B). From the top of the frame, suspended above the paper, hung a pyramid-shaped pendulum (F) with a pencil at the lower end (g). Its movement was governed by a device set in the middle of the frame: an iron armature, and a bar of soft iron coiled in wire that led back to the port-rule (h). As the copper prongs dipped into the cups of mercury they closed the circuit, sending an electrical current into the wire, which magnetized the bar, which attracted the armature, which caused the pendulum to swing, which made the pencil zigzag along the moving paper ribbon. When the circuit opened, the armature, mounted on a spring moved away from the magnet.
In operation, then, as the composing stick passed beneath the see-sawing lever, opening and closing the circuit, the register reproduced on its paper ribbon the pattern of the V-shaped notches cut into the metal blanks. The Vs signified numbers: VVVVVV represented 6, for example, VV VVV 23. To decode the message the recipient looked up the word 6 and the word 23 in a dictionary expressly compiled for the purpose.
These elements were eventually included in Morse's initial American patent of 20 June 1840. None of them were ever used in practice.

2.4. The patent model (1840)

See the patent drawings in 1.4.
In 1837 Morse enlisted an experienced machinist, Alfred Vail (see Part 1). And, very important, Alfred agreed to take on the job of refining Morse’s machinery in exchange for a share of the profits. Vail streamlined the register. He got rid of the wooden “canvas stretcher” and pendulum of the 1837 model and reinstalled the recording apparatus within a flat box. Apart from the 3 pages of comments that are part of the patent and the figure below, I couldn’t find any further information on it. As it is only an intermediate step between the 1837 model (using its basic principles) and the 1844 one, I will not go into the details of the patent texts.



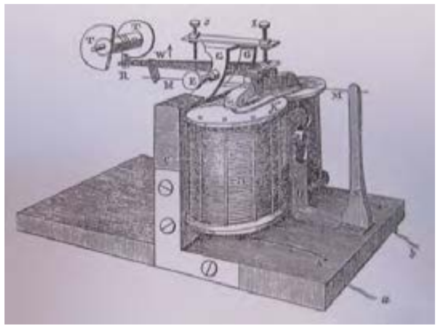
Morse's telegraph receiver from1838 made by Vail.
Contained in wooden case, a clockwork mechanism moved a paper tape beneath an electro-magnetically controlled pointer.
This picture is from the provisional French patent of October 30, 1838.
It was rejected throughout the rest of Europe as unoriginal….

2.5. Morse's (and Vail's!) second model [11.2.]

Let us now have a look at the apparatus that was used on Friday 24 May 24 1844 at 8:45. It was the beginning of the telecommunications era in the United States that began with the successful transmission of *"What Hath God Wrought"*. That message was received on the *second* Morse telegraph register made by Alfred Vail.

The following two paragraphs are part of a great article from John Casale that you 'must' read [11.2]. He writes in it that he has had the unique opportunity to spend two days examining this National treasure at Cornell University.

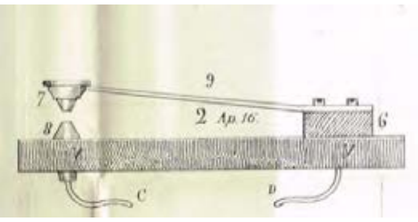
"Quote 1" At first glance, photographs of the register give the appearance of a large imposing instrument; but it's not. The dimensions are 13 11/16" *(c.35 cm)* long, by 5 15/16" *(c.15 cm)* wide, with an overall height of 8 inches *(c.20 cm).* The register actually consists of two separate assemblies; a register and a clockwork. The register portion consists of the magnets, the pen lever, the pens, and a grooved roller. The magnets, which are imposing, measure 3 inches in both diameter and height. The coils of the magnet are wound around a core of soft iron joined together by a bottom plate that form a horse shoe pattern. The copper wire is insulated with cotton that has been saturated in shellac. Wooden discs are at each end of the coils and are held together using binding wire. It has been documented that the magnets, used in the relays on the Washington-Baltimore line, were wound with 16 gauge *(= 1.29 mm)* wire. Morse and Vail thought the wire size needed to be as close as possible to the size used for the line. Three steel pens with blunt points are used. The center pen is threaded directly through the pen lever. The other two pens are held against the sides of the lever with straps. They thread into a top plate which allowed the center pen to pass straight through. When current passes through the coils of the magnets, the pen lever pivots upwards forcing the pens against the paper and into the grooves of the roller. The steel roller, with three grooves, spins freely on its pivots and allows the paper to flex within its grooves by the pressure of the pens, embossing a mark. (lines indicating dots and dashes). Early pen experiments included the use of lead and ink, but Vail's design using a steel stylus was the most efficient and maintenance free way to print. Morse referred to Vail's steel stylus as 'point sèche'*(dry point in English).* With the high reliability of Vail's steel stylus, the redundancy of 3 pens, a left over from earlier designs, proved unnecessary. A single pen was used in later designs. "*Unquote"*



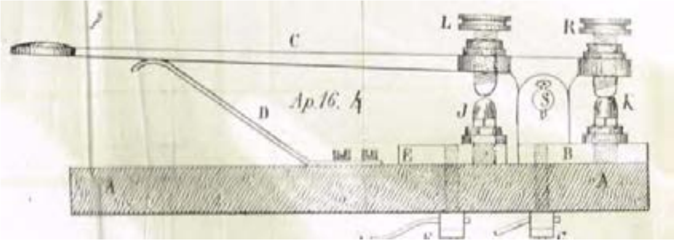
A W A

"Quote 2". It is clear that Vail wanted it known that this register was designed by him. His signature is engraved in nine different places into the wooden base. When the register was loaned for the Morse tribute on June 10,1871, a hand written note signed by Alfred Vail was found attached to the bottom of the register when it was moved. "This lever and roller were invented by me in the sixth story of the New York Observer office, in 1844, before we put up the telegraph line between Washington and Baltimore... I am the sole and only inventor of this mode of telegraph embossing writing. Professor Morse gave me no clue to it... and I have not asserted publicly my right as first and sole inventor, because I wished to preserve the peaceful unity of the invention, and because I could not, according to my contract with Professor Morse, have got a patent for it. " Vail's attached note to the singular telegraph heirloom of his last will and testament, is convincing evidence that his wish was to isolate, protect, and provide for history, his register, along with a record of its significance. Vail's 1837 contract with Morse gave him one quarter interest in the invention, (later reduced to one eighth) but he never realized any wealth from it. Significant wealth was made, though, by stockholders of successful telegraph companies. Fortunately, due to the generosity of Ezra Cornell and Hiram Sibley, Alfred Vail's original wishes are effectively being granted....".Unquote".

So much for the receiver. The first **transmitter** was a rather simple 'morsekey' made by Vail, called 'the Correspondent:



It was soon followed by a more 'industrial' model: the Lever Correspondent.



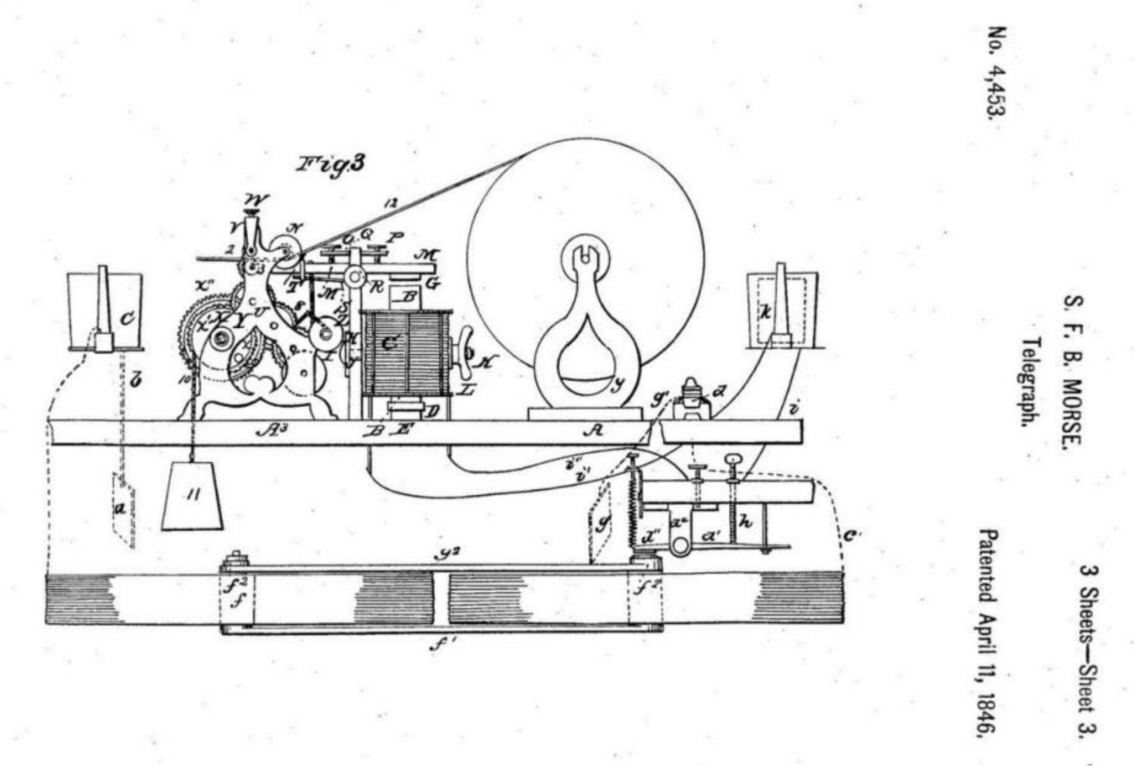
My replica

Alfred VAIL

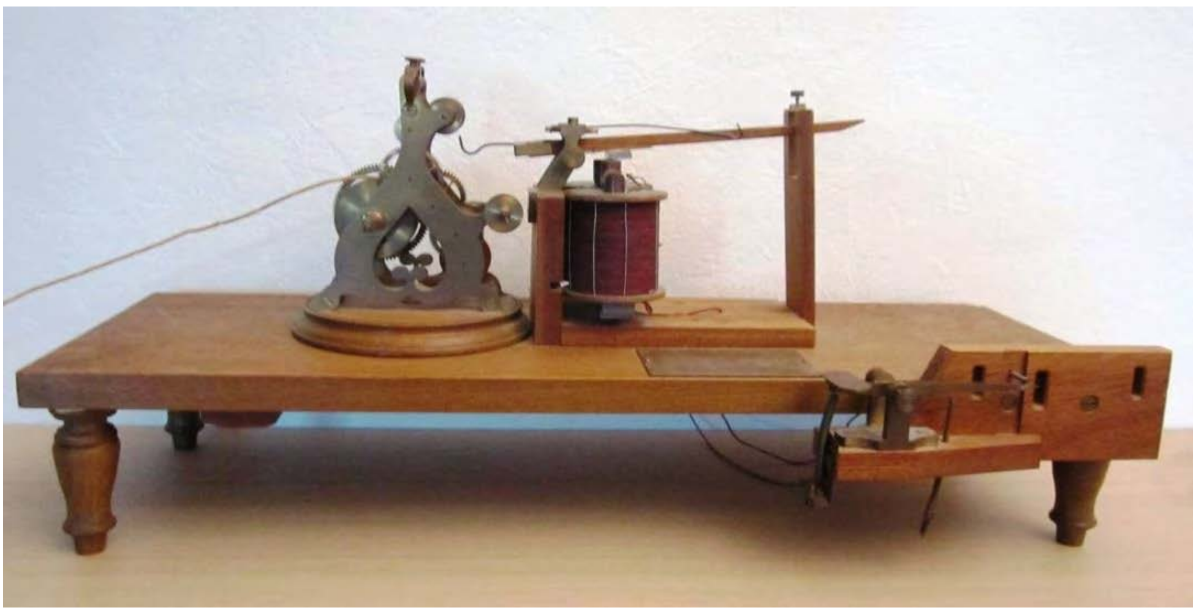
2.6. The third model (1846)

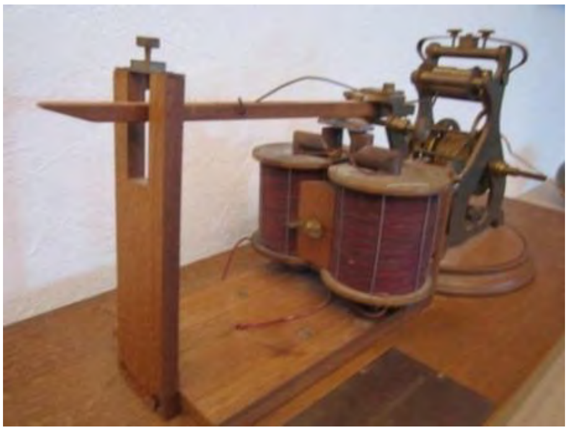
This is the model that was patented in the U.S. on 11 April 1846 as No. 4,453. The photo shows my replica as well as one of the blueprints. I have seen three such models in total (so far), one of them in the Science Museum in London. They were made in Germany in the 1930's.The basics are the same as in the 1844 model.

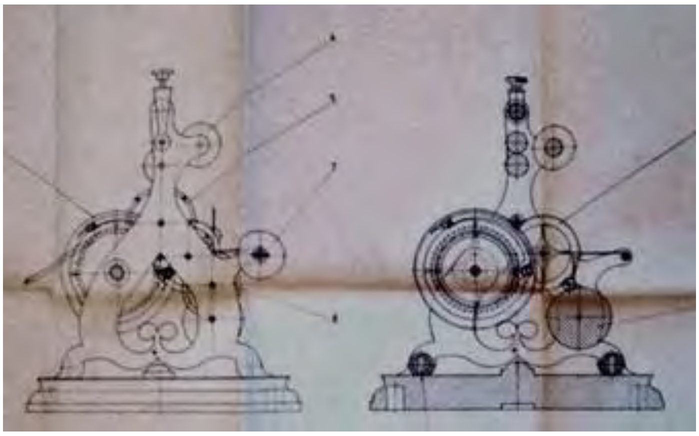
The patent model of 1846



My replica





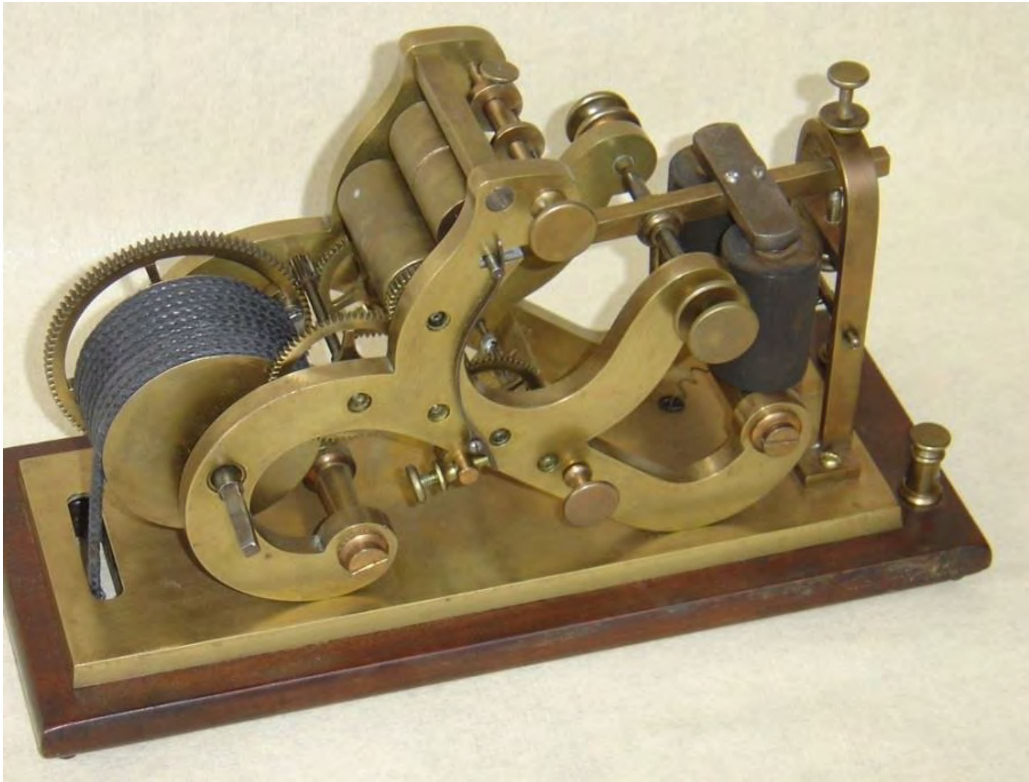


A postcard

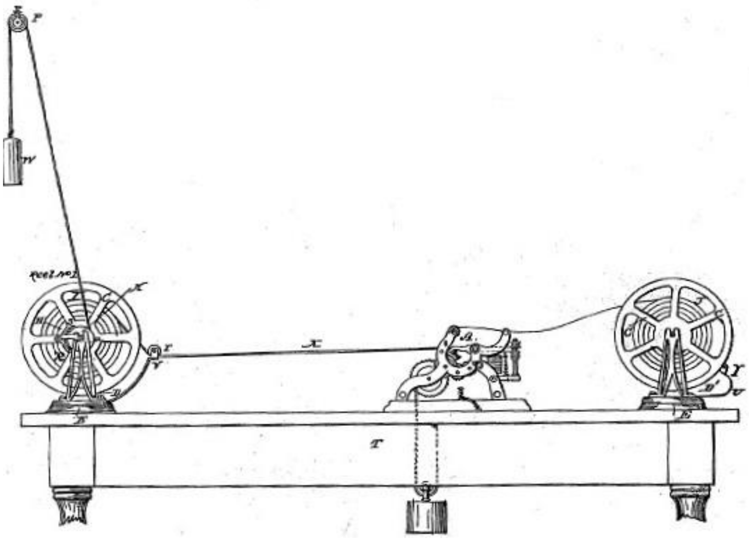
2.7. Some of my (very) old morse apparatus

2.7.1. American Morse Registers

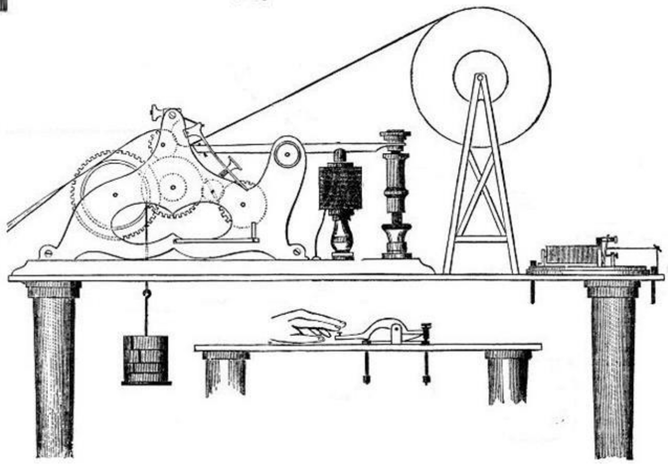
TILLOTSON
Weight
driven
embosser



CHARLES T.
CHESTER
Weight driven
embosser



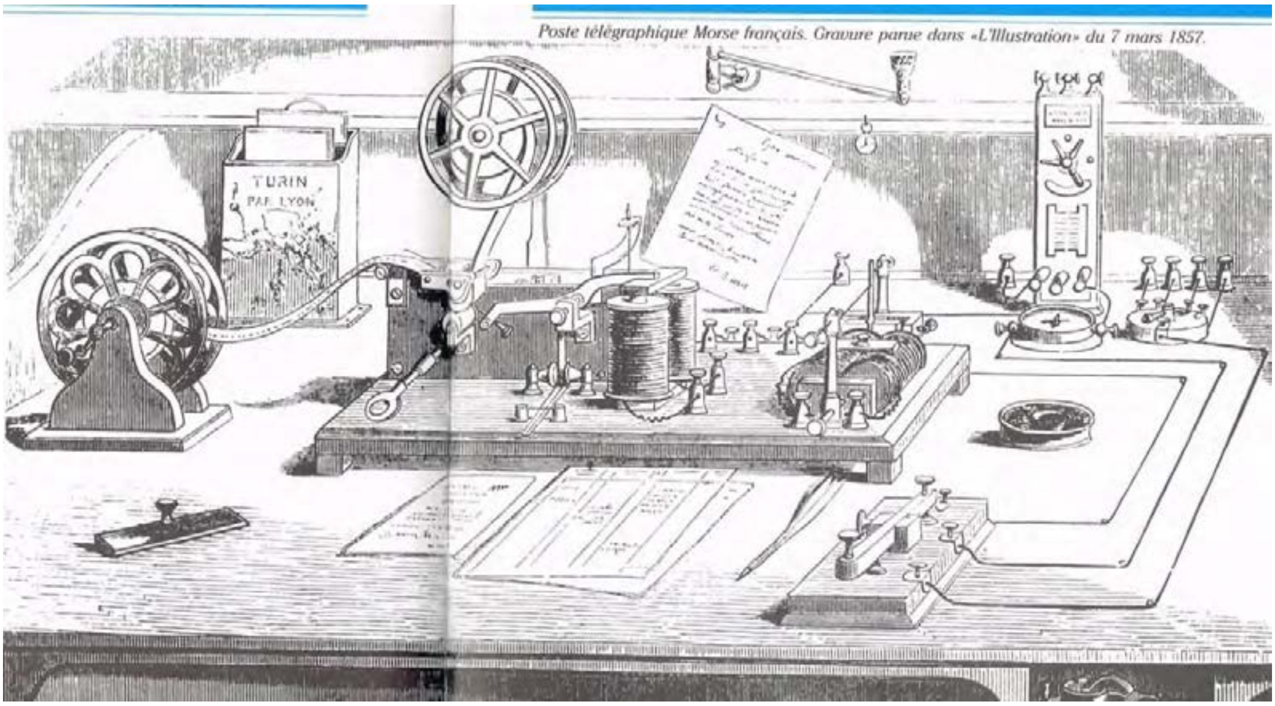
This is a ‘Daguerreotype’ (see 1.6.) from the 1860’s showing a woman operating such an old embosser .



FREDERICK PEARCE
Spring driven inker

2.7.2. A few of my European Morse Receivers

BREGUET , France c.1855 (in book Du Moncel) L. SACRE, Belgium
Spring driven embossers

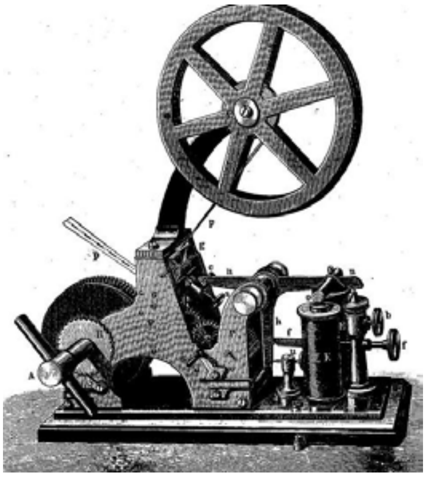


I’ve found this remarkable morse receiver in Belgium (I have never seen a similar one). It has no markings. See the relay on the left hand side

DIGNEY, France c. 1860 (with relay)

RICHEZ, Belgium; but probably licensed by DIGNEY; c. 1860

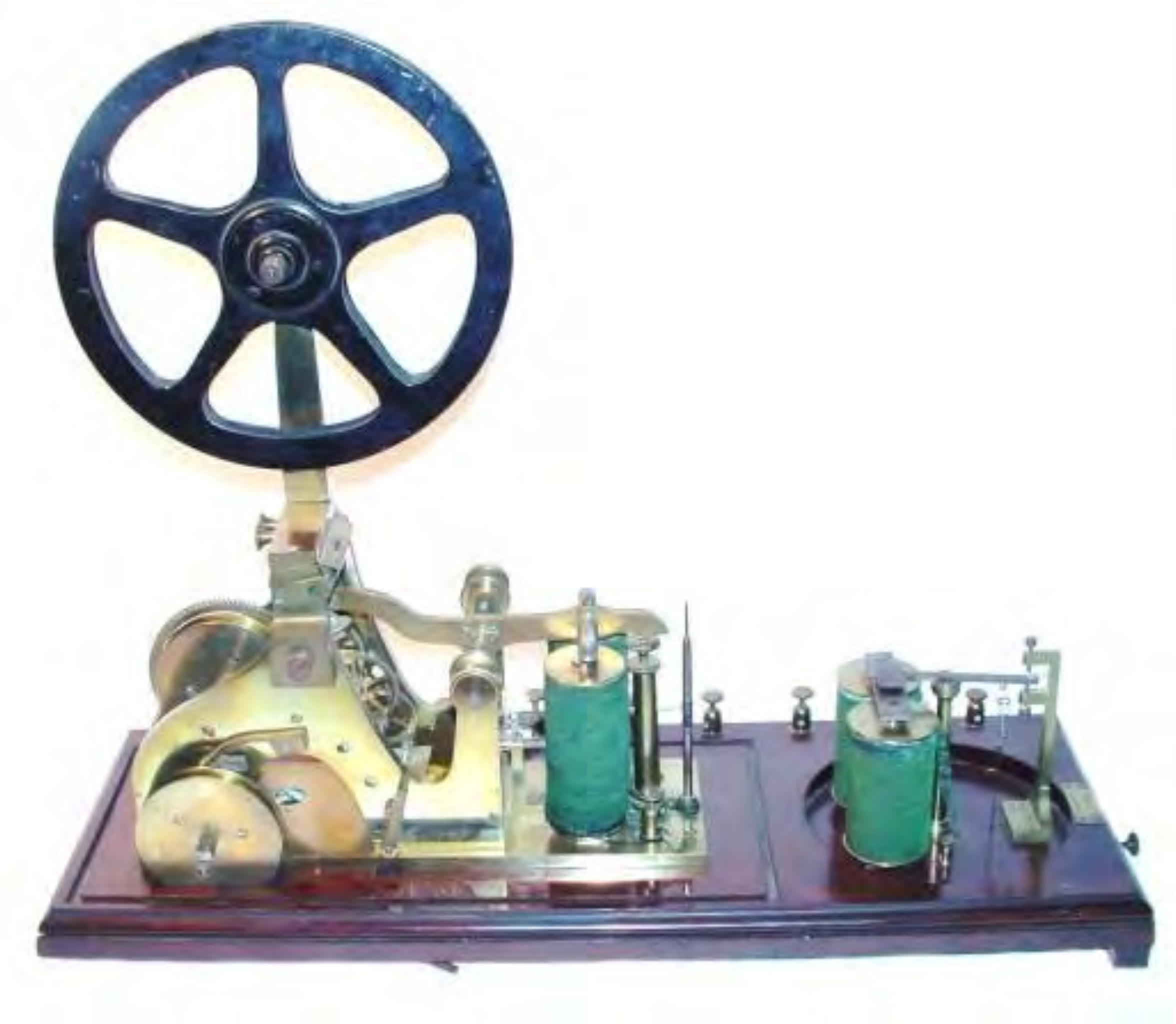
An Austrian model from c. 1850 (not me, but de receiver). Photo 1998 (a year later I got my beard). The first manufacturer of this model was Johann.M.Ekling,



Switzerland and France -1852 -weight driven embossers. Original from the Swiss (the design seems to be inspired by the Austrian one above). They were imported by France in 1852

The first telegraph in Switzerland in

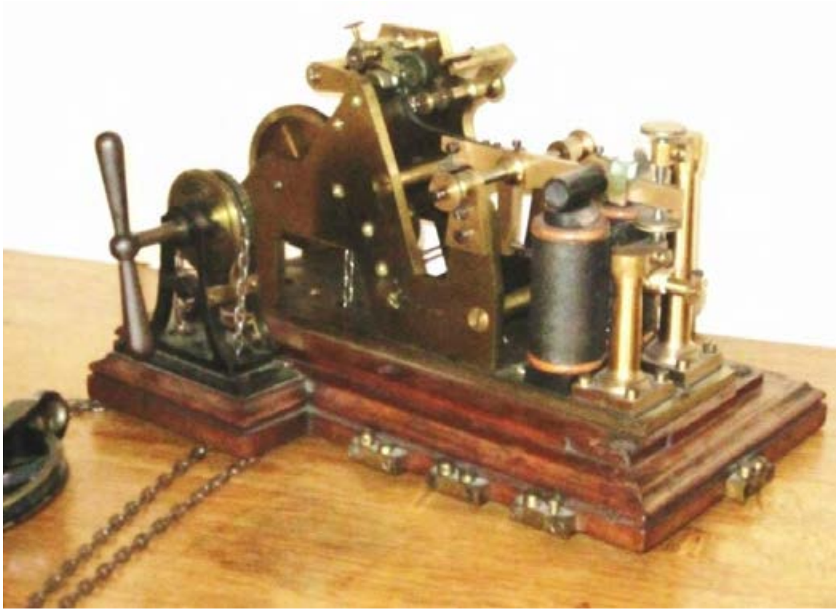
BREGUET; 1852 (based upon the Swiss model)



Some German ones

The two earliest Morse telegraphs from Werner Siemens &Georg Halske. Both were weight driven embossers.

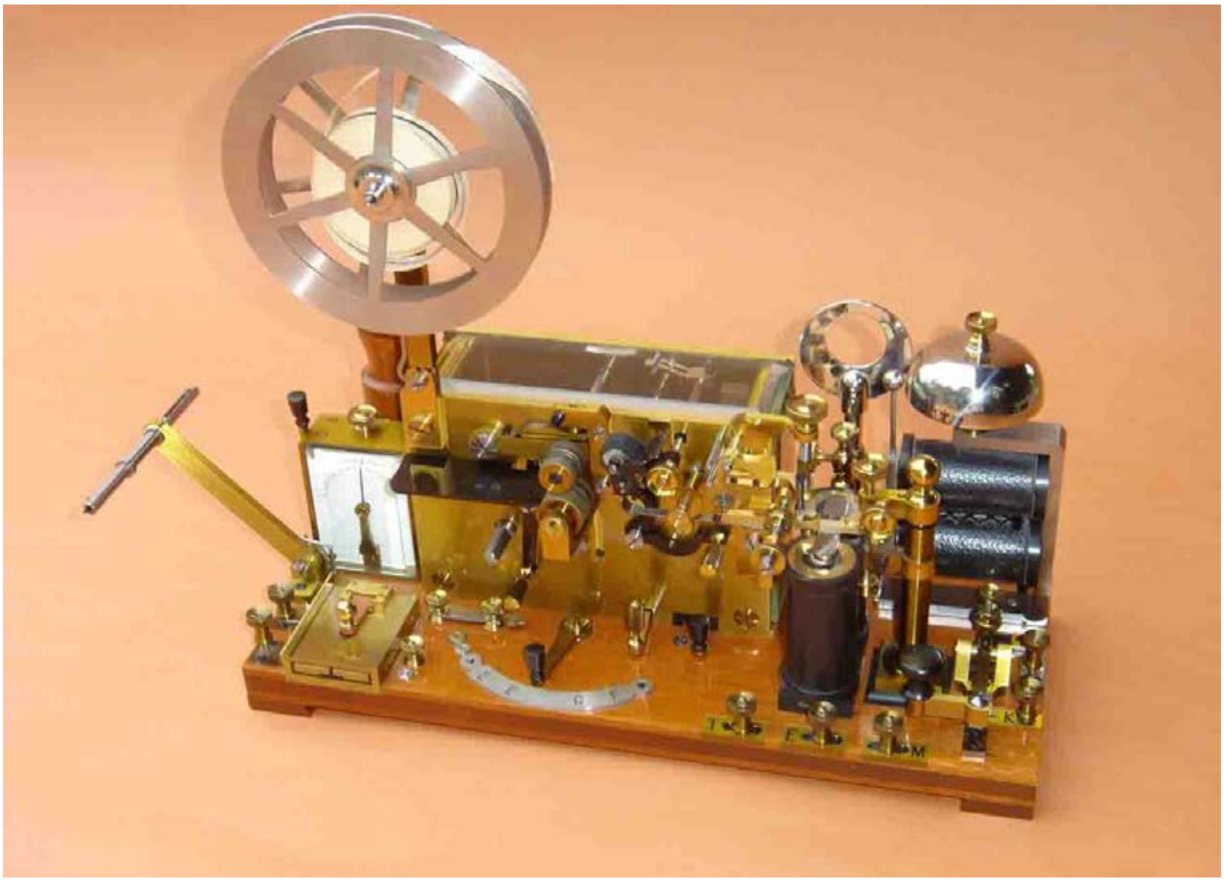
The first S&H model: from 1851

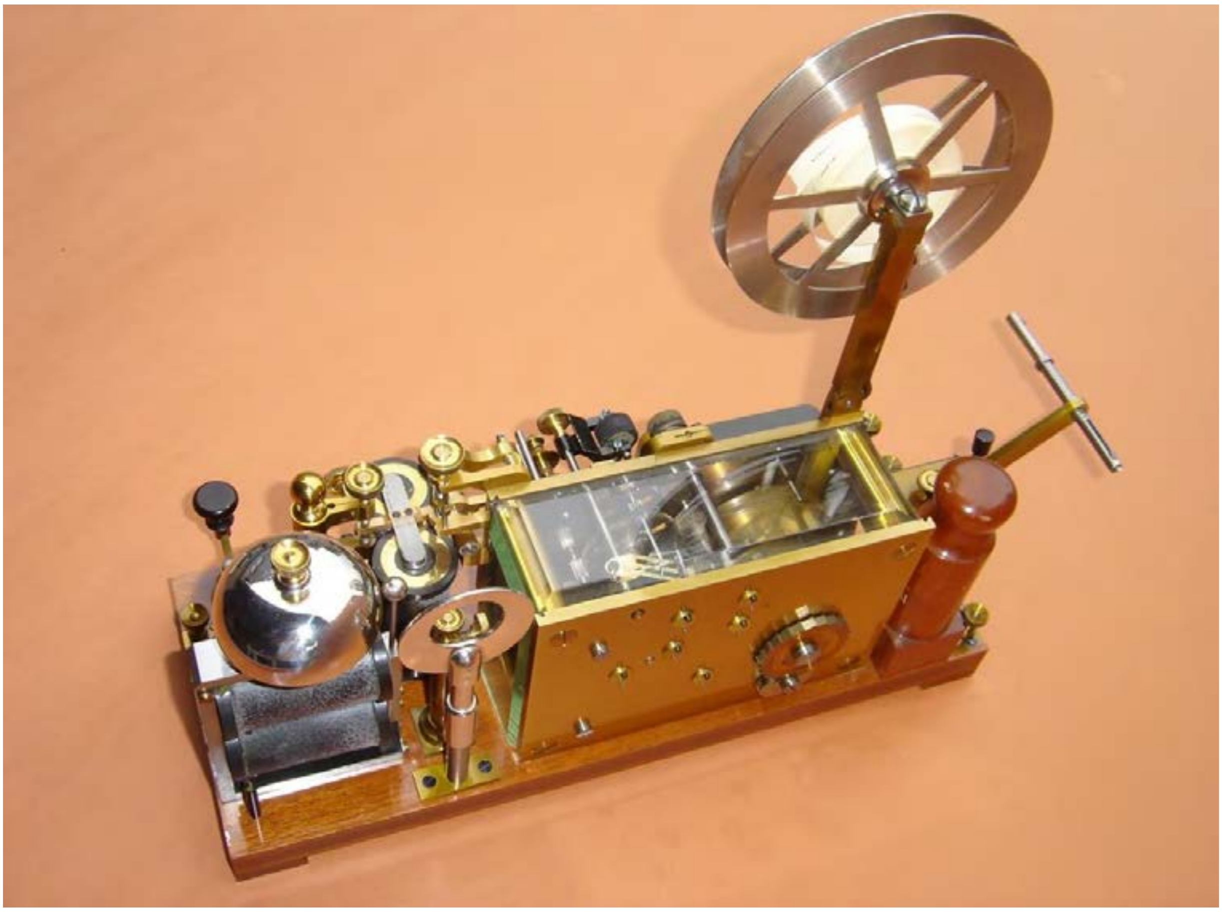


The second S&H model: from 1852 (used by the Russians in the Crimean War)

The weight driven embosser from KRÄNTZER (c1860)

One of my favourites: the portable from ERICSSON (c. 1902)





PART 3: MISCELLANEOUS

3.1. * S.O.S., or better: SOS (the 'tune' for saving lives, but not souls…)

It is now indeed well over 100 years ago that the distress signal SOS was officially put into use as an alarm signal for ships in distress.
In the period prior to radio telegraphy (before 1900), it was not easy to send out emergency signals. This could only be done with visual and auditory signals such as light, flags, horns, heliographs (reflecting the sunlight), ... and therefore only the distance to other ships or to the could be covered by such means.
Marconi and other pioneers in the field of wireless transmission changed this from around 1900. In that pioneering period messages were restricted to Morse telegraphy as voice transmission had not yet been invented.

CQD
The main application of wireless telegraphy at that time was certainly to be found in the maritime world, and the possibility of sending out an emergency call was the most important element. But during the first years of the 20th century this distress signal was not SOS but CQD. The Morse code CQ ("attention")was already a generally agreed call signal in Great Britain at that time, which asked the attention of all the stations that were listening at the relevant frequency. It preceded the transmission of the time signal or an important announcement.
It was the Marconi Wireless Telegraph Company that added the 'D' to make it the CQD emergency signal. It is now often said that CQD is the abbreviation of 'Come Quick, Danger' but it is not. It was a good mnemonic tool to remember it. But in fact it meant: (CQ)= attention! + (D) = danger. However, they probably chose the D because it is the abbreviation of both Distress and Danger. It is interesting to note that CQ is still used in amateur radio to call all stations listening on the air – both in Morse and in voice transmissions.

SOS
At the international conference on wireless telegraphy in Berlin in 1906, it was decided to define an unambiguous emergency signal that would be internationally acceptable and had to be such that it would not cause confusion. They were well aware that this was not the case with the CQD signal. My friend Greg Ulsamer drew my attention to the fact that the SOS signal had already been in use in Germany before, with an ordinance of the 'Keizerliche Marine' of 30 March 1904.
In that period the Italians used e.g. SSSDDD and the Germans preferred SOE. Eventually they opted for SOS. It was agreed that this signal would be very clearly distinguishable from all other morse signals in a message. We now call it S-O-S but beware, no 3 letters are sent, all signals come directly after each other! It could just as well have been called IJS, or SMB, or VTB, or [what goes here?] as they give the same sequence of dots and dashes. This sequence has a typical 'melody' and it clearly distinguishes itself from everything else in a morse message.
And so, as from 1 July 1908 SOS became the well-known distress signal. Creative spirits connected the expression 'Save Our Souls' (save our souls) to it. But also other variants came to the fore such as 'Sinking Of Ship', 'Send Out Succour', 'Save Our Ship'.

When the Titanic sank in 1912, the marconist alternative sent out the signals SOS and CQD.
It is not possible to calculate how many lives were saved by the use of SOS. In fact we have to say: saved by the invention of wireless telegraphy, but the SOS signal has certainly contributed a lot to the efficiency.
As we have seen above, the sending of the SOS signal has been officially stopped on 1 February 1999. There are now many other possibilities to call for emergency assistance and which use, of course, voice transmission. For example:

-The Global Maritime Distress and Safety System that works with Inmarsat satellites.
-VHF radio signals: via channel 16 and the call 'mayday, mayday, mayday' (from the French “m’aidez” = “help me”) followed by data such as identity, position, situation...
-Digital Selective Calling: a system that automatically sends out emergency data at the touch of a button.
-Satellite telephony: e.g. to the emergency number 999.
-Beacons that, when in contact with seawater, automatically send the position through.

SOS and Morse are therefore 'out of fashion' but not completely gone yet. A number of 'HAMs' (radio 'broadcast' amateurs) still use it and in certain circumstances the SOS signal can certainly still come in handy to call for help.

Back in 2008 I read in the newspaper that the elite troops and pilots in the Belgian army still have a mirror in their survival kit that should allow them to send out the SOS signal by reflecting the sun's rays (like an heliograph). And as of 2015, the United States Air Force still trains ten people a year in Morse

International contests in code copying are still occasionally held. In July 1939 at a contest in Asheville, North Carolina in the United States Ted R. McElroy set a still-standing record for Morse copying, 75.2 wpm.

PS: Interested in SOS? Then you must also read Neal Mc Ewen’s article about it, which his part of his great website [13].

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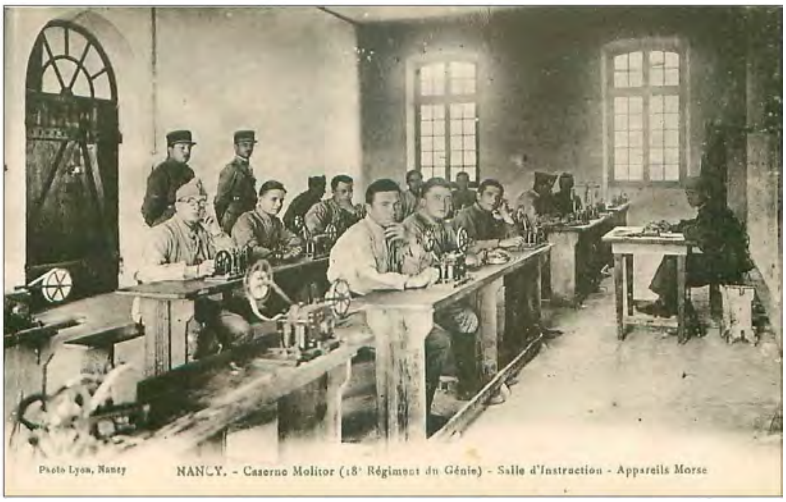
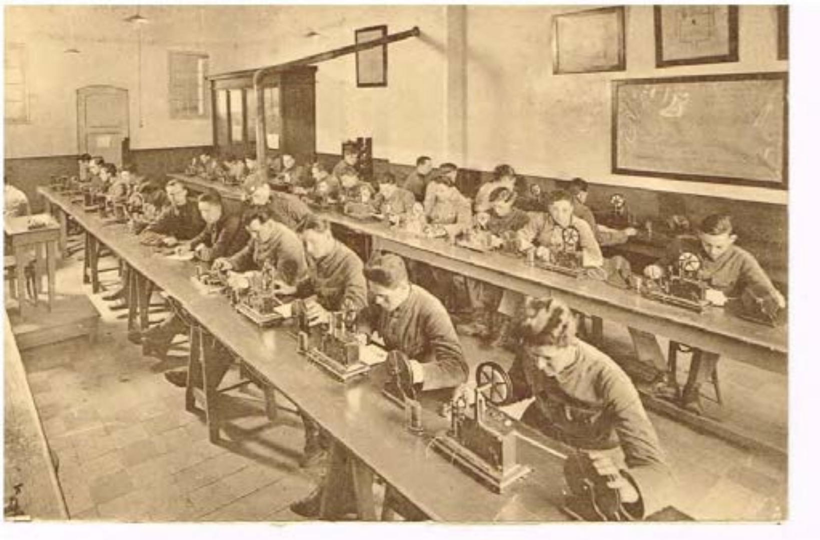


Young soldiers learning Morse. Left: in Nancy (France); right: in Vilvoorde (Belgium)



3.2. Things worth knowing (?...)

1* Morse's second death

On 31 January 1999 Morse was buried a second time. On that day, Morse signalling was officially stopped on what was then the big bastion: radio telegraphy on the commercial ships (between ships and with the coastal stations).
Of course there are still some radio amateurs who continue to practice Morse, some boy-scouts, –And, in America and Australia, some telegraph fanatics are still contacting each other using old instruments (mostly sounders). This 'dial-up telegraphy' is done by coupling their instruments with 300 bits per second modems (yes 'bits', not kBits nor Mbits...) to the public telephone network!

2* Morse versus SMS…

Have a look at this nice competition with Jay Leno as the jury.
https://www.dailymotion.com/video/x1wltc

3* Can I send Morse with my smartphone?

Yes, you can use Morse on any phone, smart or otherwise. Call the number you want and when they answer say dididit dit didahdidit didahdidit dahdahdah ..
Seriously: go for example to www.iditdahtext.com)

4* How can I learn Morsecode?

My friend Google will give you a lot of possibilities, including Apps for your smartphone.

5* How to convert text into Morse and vice versa?

A simple search on Google gives you also here a lot of possibilities to do it.
Here are two of them:
https://www.geocachingtoolbox.com/index.php?lang=en&page=morse
http://morsecode.world/m/eJxjYhIR8XEN9XZVCHJ1dA7xdA1WBAAj-AQ0

6* Records

International contests in code copying are still occasionally held. In July 1939 at a contest in Asheville, North Carolina in the United States Ted R. McElroy set a still-standing record for Morse copying, 75.2 wpm (words per minute), 'Paris' being the typical word (5 letters and 50 dots durations). Boy Scouts of America may put a Morse interpreter's strip on their uniforms if they meet the standards for translating code at 5 wpm.

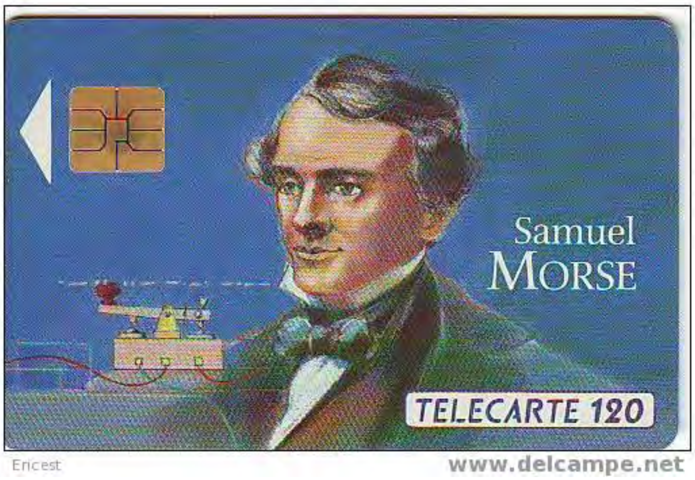
7* Who coined the term "bug"

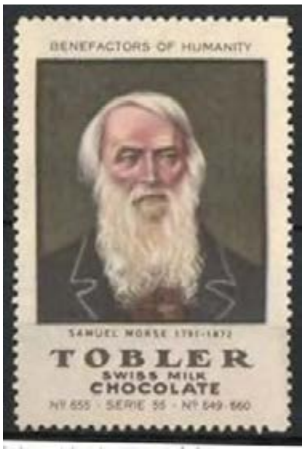
There are two meanings to the word "bug" in the early history of the telegraph.
On 3 March 1878 Thomas Edison joked in a letter to Western Union President William Orton: "You were partly correct, I did find a 'bug' in my apparatus, but it was not in the telephone proper. It was of the genus 'callbellum.' The insect appears to find conditions for its existence in all call apparatus of telephones."
The second meaning evolved from the technical problem to become a nickname given to semi-automatic morse keys..
Read the story in [11] (John Casale)
So it was not the famous Grace Hopper who was the first to use this word to indicate a problem. Her story started on 9 September 1947, when the Harvard's Mark II Aiken Relay computer was malfunctioning. After rooting through the massive machine to find the cause of the problem she found the bug. It was an actual insect, a moth... It was caught between the contacts of a switch ...

3.3. Various illustrations (stamps, chromos, telephone cards, …)

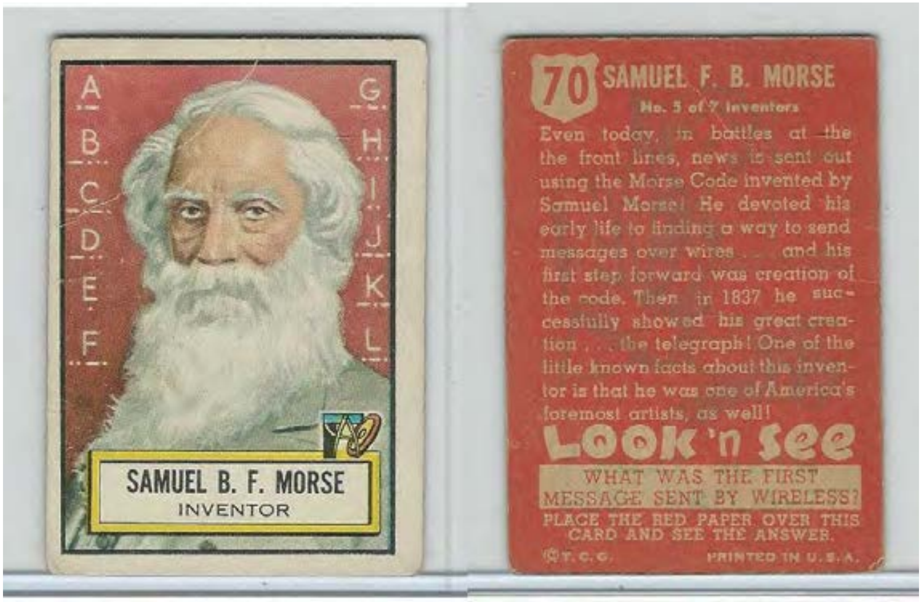
Note that one can learn from the models, countries and dates that are used on the stamps and postcards...

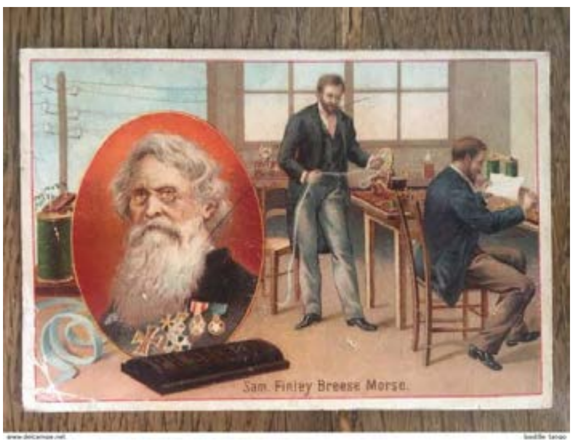
A German poem of praise




BENEFACTORS OF HUMANITY
SAMUEL MORSE 1791-1872
TOBLER
SWISS MILK
CHOCOLATE
Nº 655 · SERIE 55 · Nº 649-660


S.F.B. MORSE.
ELECTRIC TELEGRAPH.
Watermark Only - NOT On The Card
SERIES.
NO. 18
S. F. B. MORSE.
SAMUEL FINLEY BREESE MORSE was born in 1791, in Charlestown, Massachusetts, U.S.A. After studying art in London, he returned to the United States, and in 1826 was made President of the National School of Design. His attention was not given to art alone, however, but also to Chemistry and especially to electric and galvanic experiments. In 1832 he conceived the idea of that system of electric telegraphy with which his name is identified, and sent his first message in 1844.
Issued by
R. & J. HILL, LTD.
Pipe Mixture Specialists
LONDON.


A B C D E F G H I J K L
SAMUEL B. F. MORSE
INVENTOR
70 SAMUEL F. B. MORSE
No. 5 of 7 Inventors
Even today, in battles at the the front lines, news is sent out using the Morse Code invented by Samuel Morse! He devoted his early life to finding a way to send messages over wires . . . and his first step forward was creation of the code. Then in 1837 he successfully showed his great creation . . . the telegraph! One of the little known facts about this inventor is that he was one of America's foremost artists, as well!
LOOK 'n SEE
WHAT WAS THE FIRST MESSAGE SENT BY WIRELESS?
PLACE THE RED PAPER OVER THIS CARD AND SEE THE ANSWER.
©T.C.G.
PRINTED IN U.S.A.


Sam. Finley Breese Morse.


F. D. C.
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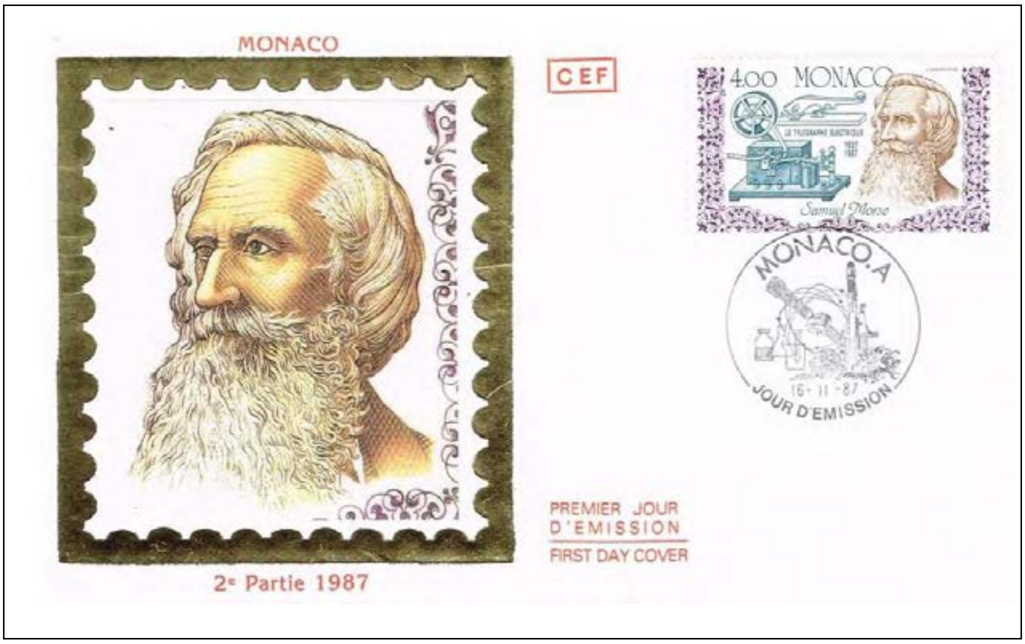
MONACO
CENTENAIRE
DE L'UNION INTERNATIONALE
DES TELECOMMUNICATIONS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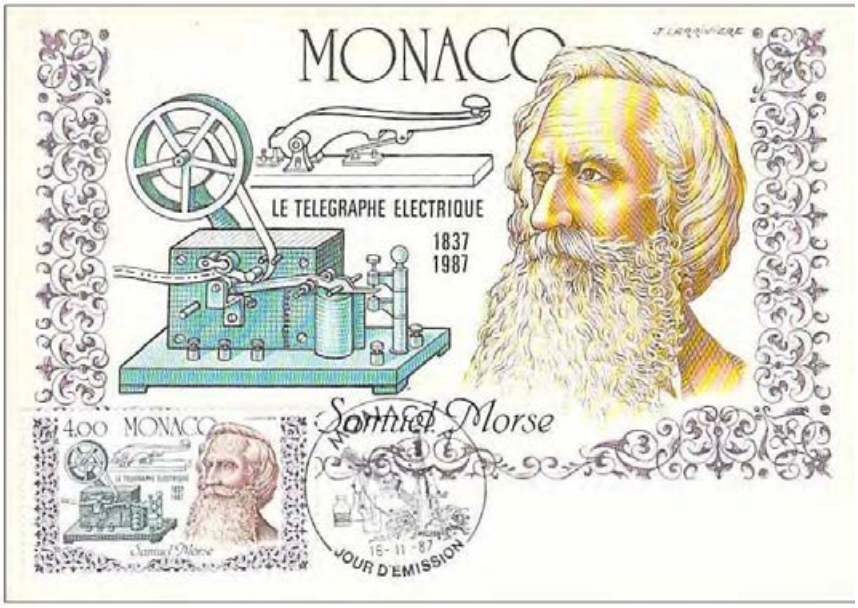
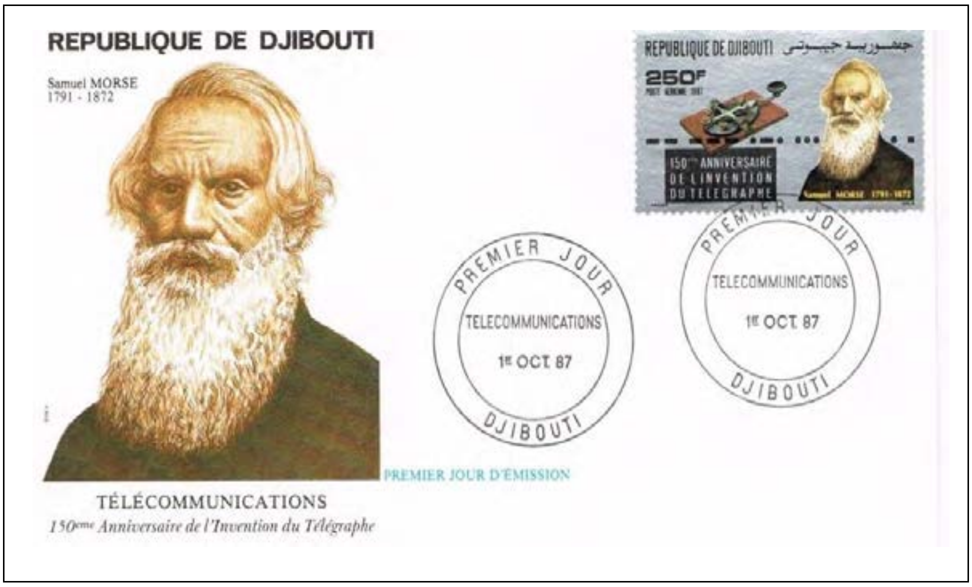
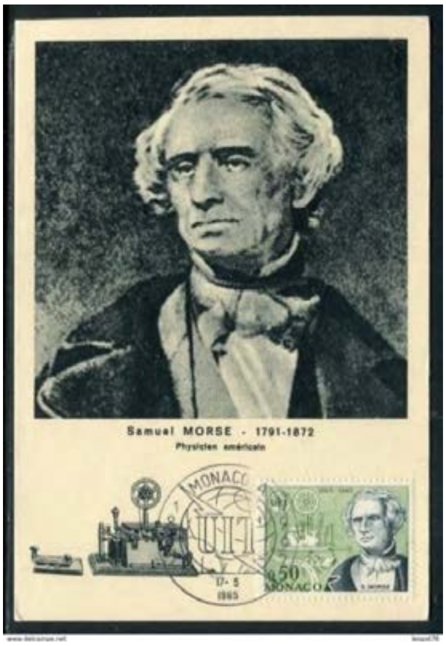
4,00 MONACO
LE TELEGRAPHE ELECTRIQUE
1837
1987
Samuel Morse
MONACO.A
16-11-87
JOUR D'EMISSION
PREMIER JOUR
D'EMISSION
FIRST DAY COVER
2e Partie 1987


J. LARRIVIERE
MONACO
LE TELEGRAPHE ELECTRIQUE
1837
1987
Samuel Morse
4,00 MONACO
16-11-87
JOUR D'EMISSION


EUROPA 79
ITALIA 170
ITALIA 220
EUROPA
ROMA FILATELICO
CEPT 79
30 · 4 · 1979
Giorno di emissione
F.D.C. CAPITOLIUM 384


REPUBLIQUE DE DJIBOUTI
Samuel MORSE
1791 - 1872
REPUBLIQUE DE DJIBOUTI
250F
150ème ANNIVERSAIRE DE L'INVENTION DU TELEGRAPHE
Samuel MORSE 1791-1872
PREMIER JOUR
TELECOMMUNICATIONS
1ER OCT 87
DJIBOUTI
PREMIER JOUR D'ÉMISSION
TÉLÉCOMMUNICATIONS
150ème Anniversaire de l'Invention du Télégraphe


Samuel MORSE - 1791-1872
Physicien américain
MONACO
UIT
17-5
1965


République Populaire du Congo
150e Ann. du premier essai télégraphique
par Samuel MORSE 1837 – 1987
POSTES 1988
120F


REPUBLIQUE CENTRAFRICAINE
485F

Samuel MORSE
République du Niger
ESPAÑA correos
MUSEO POSTAL
350F
150e anniversaire de l'invention du télégraphe
Samuel MORSE 1791-1872
République du Niger POSTES 1987
1865-1965
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S. MORSE
ETAT DU CAMBODGE
S. MORSE Télégraphe
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EXPOSITION MONDIALE SEVILLA 92
ROYAUME DU CAMBODGE
POSTES 2001
125 JAHRE UIT
DDR
SVERIGE 170
EUROPA
REPUBLIQUE DU DAHOMEY
TIMBRE TAXE
RECEPTEUR MORSE
DANMARK EUROPA
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JUGOSLAVIJA
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PITCAIRN ISLANDS
MARCONI 100th Anniversary of First Radio Transmission
30F REPUBLIQUE GABONAISE
TELEGRAPHE MORSE
CENTENAIRE DE L'UNION INTERNATIONALE DES TELECOMMUNICATIONS 1865-1965
13
BELGIQUE-BELGIË
Prior
المملكة المغربية
2,00
POSTES
1990
ROYAUME DU MAROC
Ísland
10.00
LANDSSÍMI ÍSLANDS
SJÁLFVIRKUR SÍMI UM ALLT LAND
NOUVELLE-CALÉDONIE ET DEPENDANCES
19F
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telégrafo
DDR
Deutsche Post
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1880
Telegrammübermittlung
1979
REPUBLICA DEL PARAGUAY
CORREOS
2
NEW ZEALAND
1862
1962
3D
CENTENARY OF TELEGRAPH IN NEW ZEALAND

RESOURCES & REFERENCES

Books

[1] LIGHTNING MAN - The Accursed Life of Samuel F. B. Morse; Kenneth SILVERMAN; 2004; 504 p.

[2] SAMUEL F.B. MORSE - Eine Biographie; Christian BRAUNER; 1991; 267 p.

[3] THE AMERICAN ELECTRO-MAGNETIC TELEGRAPH: with the reports of Congress, and…; Alfred VAIL; 1845 - recent reprint; 208 p.

[4] EARLY HISTORY OF THE ELECTRO-MAGNETIC TELEGRAPH - From Letters and Journals of Alfred Vail; Arranged by his Son James Cummings VAIL; 1914 – recent reprint; 36 p.

[5] DESCRIPTION OF THE AMERICAN ELECTRO MAGNETIC TELEGRAPH - now in operation between the cities of WASHINGTON AND BALTIMORE; Alfred VAIL; 1845 - recent reprint; 24 p.

[6] ELECTRICIANS AND THEIR MARVELS; Walter JERROLD; c 1896; 160 p.

[7] THE VICTORIAN INTERNET; Tom STANDAGE; 1998; 216 p.

[8] ELECTRIC TELEGRAPH - History, Theory, and Practice; Georges PRESCOTT;1866 fourth edition - reprinted 1972, 508 + 6 p. and via https://www.princeton.edu/ssp/joseph-henry-project/relay/History_theory_and_practice_of_the_elect(1).pdf

Websites

[9] https://www.thoughtco.com/biography-of-samuel-morse-1992165

[10] https://en.wikipedia.org/wiki/Samuel_Morse

[11] http://www.telegraph-history.org/ The website from John Casale: a MUST SEE
[11.1] http://www.telegraph-history.org/edison/appletons/index.html Working of a typical register
[11.2] http://www.telegraph-history.org/alfred-vail/index.html Details of the 1844 model

[12] https://www.law.gmu.edu/assets/files/publications/working_papers/1422.pdf.. An in-depth analysis of 70 pages on the “”the Great Telegraph Patent Case”, also called the “O’Reilly v. Morse”.

[13] http://www.telegraph-office.com The website from Neal Mc. Ewen; also a MUST SEE
[13.1] http://www.telegraph-office.com/pages/vail.htm Did Samuel F. B. Morse Invent the Code?

[14] http://distantwriting.co.uk/technicaldetail.html From the late Steven Roberts (oriented UK)

[15]: https://en.wikipedia.org/wiki/Morse_code Of course I also appealed to ‘Wiki’ (and made a gift for it)

Websites from collectors

Apart from the above, there are a great number of websites set up by individuals, mainly in the USA. Most of my fellow collectors (and friends) over there are focused upon Morse keys (it is indeed easier to collect keys compared to registers…). But there are a lot of interesting sites anyway.

www.telegraphlore.net from Greg Raven. My old website is a chapter on this one.

http://atlantic-cable.com from Bill Burns

http://www.telegraphkeys.com/pages/collection.html from Doug Palmer
http://www.telegraphkeys.com/pages/registers.html

http://w1tp.com/ from Tom Perera

https://sites.google.com/site/telegraphkeys/Home from Tim Patton

http://www.sparkmuseum.com from John Jenkins

http://www.n7cfo.com/ from Lynn Burlingame

http://www.la.ca.us/frandy / from Randy Cole

http://www.samhallas.co.uk/telecomms.htm from Sam Hallas

http://www.zianet.com/sparks/index.html from Russ Kleinman

http://www.artifaxbooks.com/ from the late Tom French (+ 2016)

https://mysite.du.edu/~jcalvert/tel/telhom.htm from James B. Calvert

http://www.morsemad.com/ from John Snell

https://australiantelegraph.wordpress.com/contents/ from Ron McMullen

https://www.telegraphy.eu That's my recent one (I'm also a collector ;o)
www.telegraphsofeurope.net .This is my old one, only showing photographs of part of my collection

I'm pretty sure guys that I forgot to mention several other interesting ones.
So please remind me so that I can add them.

THANK YOU

Mr. **Sam Hallas** has been so kind as to review my 'Flemish English'. Sam is on the board of the U.K. Telecom Heritage Group (THG) where he is the archivist. And as a Desk Top Publishing specialist delivers each quarter a great THG Journal.

Mr. **John Casale**, a recognised authority regarding American telegraphy, for having given me the authorisation to copy paragraphs out of his great website [11].

Morse's granddaughter, Leila Livingston-Morse, prepares the original telegraph for a ceremony commemorating its centennial in 1944.