

HOW MORSE CODE WAS ORIGINALLY SENT: THE ENDURING ENIGMA OF THE LITTLE ‘STRAP KEY’

The simple strap key remains something of an enigma for Morse key collectors. Those few remaining former postal, railroads, press, or commercial landline telegraphists; those who sent communications by Morse code in their former capacity of airborne, army, navy or merchant navy radio operator; or the current worldwide fraternity of amateur radio operators preferring to working CW, many of whom may be collectors of telegraph keys, all of these will likely be familiar with the simplest form of Morse key (Figures 5-8).

They will have seen drawings of that earliest strap key, the ‘Correspondent’ devised by Alfred Vail¹ who many hold as the father of Morse code (rather than the claimed inventor Samuel Finley Breese Morse).² The ‘Correspondent’ was a strap key used by Alfred Vail and Samuel Morse in their first May 1844 telegraphy experiments between Washington and Baltimore (Figure 1). It would indeed be tantalising to think that the 1843 strap key in the collection of the National Museum of American History at the Smithsonian Museum in Washington on loan from the Western Union Telegraph Company is in fact one of the strap keys used during those May 1844 experiments.³ Those simple strap keys certainly remained ‘in vogue’ for some six months after the first May 1844 experiments, until Alfred Vail designed and constructed his famous ‘Lever Correspondent’ Morse key some six months later and now also in the National Museum of American History at the Smithsonian Museum in

¹ Alfred Vail, 1847, *The American Electro Magnetic telegraph: With The Reports of Congress, And A Description Of All Telegraphs Known, Employing Electricity Or Galvanism. Illustrated By Eighty-One Wood Engravings*. Philadelphia: Lee & Blanchard, pp. 19, 22. However, it now seems likely that Alfred Vail was also influenced by the work of English scientist Sir William Fothergill Cooke, whose notebook containing sketches of a strap key reached the United States in the possession of Frederick Kerby, Cooke’s former assistant. In turn, Frederick Kerby became an associate of Samuel Morse and Alfred Vail. For a summary of these most recent developments see Tom Perera’s website at <http://w1tp.com/cooke/>. Also see footnote 4 for further indication of collaboration between prominent individuals working on related technologies.

² See for example: Pope, Franklin Leonard, 1888, ‘The American Inventors of the Telegraph – With special reference to the services of Alfred Vail’. *The Century; a popular quarterly*. Volume XXXV Issue 6, April 1888, pp. 924-944. New York: The Century Company.
<https://babel.hathitrust.org/cgi/pt?id=coo.31924079633370&view=1up&seq=934>

³ The item in question is Catalogue Number 181410, Accession Number 31652. The inventory description simply states “This key is an example of the earliest type of key used by Samuel Morse and Alfred Vail.” See: https://americanhistory.si.edu/collections/search/object/nmah_706715.

Washington.⁴ That ‘Vail Lever Correspondent’ was premised on the basis of a lever turning on a horizontal axis, the pivot, suspended between trunnions that in combination provided the up and down movement of the lever, requiring less effort and allowing for greater sending speed than permitted by the brass blade-spring of the strap key (Figure 2).⁵ In its pivoting lever design, the ‘Vail Lever Correspondent’ became the prototype of all later ‘straight’ (that is ‘up-and-down’) Morse keys, at least until the development of the semi-automatic Morse key or so-called ‘bug’, which provides a series of automatic dots through a weighted and spring-loaded swinging pendulum.

It is now difficult to say how quickly the uptake of the ‘Vail Lever Correspondent’ resulted in the mass production of the more common brass Morse keys manufactured by Phelps, Tillotson, Greeley, Bunnell, Western Electric, MESCO, Signal Electric, and a host of other manufacturers, both in the USA and world-wide. A study of a sample of such individual companies may provide indication for the starting point of, and increasingly widespread production and use of the pivoting ‘straight’ key as conceived by Alfred Vail in November-December 1844 and again in 1845.⁶

What is certain is that the simple strap key never fell totally into disuse. Scientist Joseph Henry continued to use them in his electricity experiments around the 1850s and two of his strap keys are now also preserved in the collection of the National Museum of American History at the Smithsonian Museum.⁷ However, it can hardly be expected that the less efficient strap keys

⁴ For an illustration of his ‘Lever Correspondent’, see Vail’s 1847 *The American Electro Magnetic Telegraph*, p.41. For interesting comments on the development of the ‘Vail Lever Correspondent’ which appears to have been a collaboration between different people working in related fields, see: Franklin L. Pope, ‘Relays, Keys, Registers and Sounders’, in *The Telegrapher*, July 27, 1872. <http://www.telegraph-history.org/pope-articles/index.html>. For the ‘Vail Lever Correspondent’ (Catalogue Number 181411, Accession Number 31652) see: https://americanhistory.si.edu/collections/search/object/nmah_1096762. What this collaboration demonstrates, as it does with the influence of Cooke’s notebook on Alfred Vail’s Correspondent, is that there was likely active cross-fertilisation going on between scientists, inventors and instrument makers working at the same time on related ideas and technological innovations.

⁵ Its construction is assumed to have taken place around November-December 1844. Vail’s 1847 *The American Electro Magnetic Telegraph* was written during 1845 (Introduction dated 18 August 1845) and makes reference on page 40 to the Lever Correspondent having been used “during the past winter”, that is, during the period December 1844 – February 1845.

⁶ A third telegraph key developed and constructed by Alfred Vail in 1845, also in the National Museum of American History at the Smithsonian Museum in Washington (Catalogue Number 181412, Accession Number 31652) is less well known, see: https://americanhistory.si.edu/collections/search/object/nmah_706535.

⁷ See: https://americanhistory.si.edu/collections/search/object/nmah_706717.

continued in widespread operational use, and maybe this is a reason why they do not seem to figure in some of the major instructional works on landline telegraphy that aspiring operators had to study. At least, and unless hidden in some dense schematic circuit diagram, they do not stand out and rate no mention under several search terms one might choose to check in relevant indices.⁸ Interestingly, in many such circuit diagrams, what could arguably be identified as a strap key remains the symbol for an open key.

Even so, and certainly in the American market, essentially two versions of strap keys remained in use well into the twentieth century. The first one may be discounted as a Morse key (Figures 9-10). Measuring at its wood or Bakelite base 15cm by 9cm, the strap itself is of fairly thick brass and requires a degree of force to press against its ‘make’ contact. The stiffness of the strap makes it entirely unsuitable for telegraphy use, as no real code is able to be sent with it, or extremely slowly, if at all, and in any continued use placing the operator at extreme risk of the dreaded ‘glass arm’, the telegraphist’s form of repetitive strain injury (RSI). These keys, with heavy binding posts at back, were certainly used by the railways, mounted in a glass covered wooden box and suspended vertically from the wall. They either served as switches operating track-side equipment, or they were used to send a single signal to a distant operator as instruction to action such equipment as points, signal settings, etc. They may also have been used to raise the alarm in case of fire when placed in locally positioned ‘fire boxes’. If their use in a commercial telegraphy setting must be ruled out (although limited use of slow-speed Morse code may have occurred), the issue is nevertheless confused by the fact that such heavy railroad or emergency services strap keys were also manufactured by companies producing telegraphy-related equipment and advertised these large strap keys in their company catalogues.⁹

The same cannot be said for a smaller type of strap key, fitted to a slate or wooden base of dark walnut or mahogany and measuring 10cm by 5cm. A Bunnell mahogany-based version featured in company catalogues at least between 1901 and 1918, with illustrations displaying two or three binding posts

⁸ For example, T.E. Herbert, 1907, *Telegraphy*. London and New York: Whittaker & Co.; H.W. Jenvey, 1904, *Practical telegraphy*. Melbourne: George Robertson & Co.; Hawkins and Staff, 1917, *Hawkins Electrical Guide Number Eight*. New York: Theo Audel & Co.

⁹ See for example the J.H. Bunnell & Co., Inc. catalogue number 31 of 1928, listing on page 3 their “Extra heavy railroad strap key”.

of the more common US types (Figures 3-4). Other manufacturers such as MESCO or Western Electric who advertised their wares in company catalogues will similarly have featured such keys.

Two of the four American small strap keys owned by the author have inscriptions which directly link them to telegraphy-related commercial business: “Foote.Pierson & Co. N.Y. W.U.T.Co” (Figure 7) and “J.H. Bunnell & Co. W.U.Tel Co.” In the case of Foote-Pierson, that company did not start operating under its own name until 1896 as the successor to L.G. Tillotson & Co. and E.S. Greeley & Co. Similarly, the Bunnell catalogues of 1901-04 also suggest that this type of small strap key dates to either the late 19th century, or the early 20th century.

On that basis we may assume that there is no direct chronological link, that is, in terms of active commercial operating, between the earliest 1844 and these strap keys of some sixty years later. The intervening years and the many lever-type Morse keys since produced by the many companies specialising in telegraphy equipment would rule against large-scale use of strap-style Morse keys as both inefficient and unlikely, as has been argued.

The question thus remains what these small, and admittedly ‘pretty’, strap keys were used for. Their featuring in telegraph manufacturers’ catalogues and their association with the Western Union Telegraph Company would rule out non-telegraphy-related use. Indeed, the 1901-04 Bunnell catalogue designates the strap key as a ‘signal key’, taken here to mean ‘telegraph key’. Even so, non-telegraphy-intended use keeps surfacing periodically in the descriptions of strap keys when offered for sale on eBay or when commented on in the Facebook pages of amateur radio groups, telegraphy aficionados, and Morse key collectors. While contradictory named as ‘Morse keys’, such sources may nevertheless say that this particular type of strap key was *“used not for sending Morse code, but instead for connecting different signal circuits, for telegraph line wire testing purposes, and fire alarm telegraph circuits,”* adding that a strap key of this type would make *“a nice addition to a collection of telegraph keys, antique radios, or even fire alarm memorabilia.”*¹⁰ Other suggested use has been scientific laboratory use. What seems to occur to a certain degree is

¹⁰ eBay post August 2019.

confusion between the larger non-telegraphy but railroad and emergency services-related strap keys and the smaller versions that do have an apparent telegraphy-related purpose.¹¹ Equally, misinterpretation may be occurring between the small telegraphy-related strap keys and the small – but often more complex – strap keys used in a laboratory setting (Figure 11). However, what their use precisely entailed remains speculative,¹² as does the answer to the question whether they can be linked with the development of other Morse key concepts such as the ‘sideswiper’ or ‘Cootie’ key.¹³

If any of the above telegraphy-related uses are correct, then their precise operation has not been described, or at least not in an easily accessible format with, as observed, landline-related telegraphy instructional materials not overtly referencing them nor providing specific descriptions about their intended use. The precise use of these early Morse keys will be increasingly clouded by the mists of time the further the era of active commercial Morse code operation recedes into the past. Further study of documentary records, and the ever diminishing recollections of the remaining few landline telegraphists, may still shed light on their use. What we are left with for now is one of the many ‘little mysteries’ that those who remain interested in the history and use of Morse, and the keys used to send code, have to confront.

At least one more (relatively) recently produced and used strap key has nevertheless kept the memory and telegraphy-related use of the earlier strap keys alive. The US Army Signal Corps allocated a numbering system prefixed with the letter ‘J’ to each of its Morse keys. Morse key type J-46 is indeed a strap key and was used during the Second World War as part of the ‘Signal Lamp Equipment EE-84’ and produced in 1942 by the Winslow Company (also known as ‘Winslow Electronics’) for portable light signalling during field-based operations (Figure 12).

¹¹ See for example Lynn Burlingame N7CFO Keyletter #7 page 70 and Keyletter #12 page 128.

¹² Bill Holly K1BH (personal communication) views the presence of a contact gap adjustment mechanism as a possible indication of telegraphy-related use, suggesting that if used as a simple switch such would not “*require close regulation of the contact gap.*” However, strap keys of the heavier variety that would clearly be unsuitable for regular and sustained Morse transmission still have the contact gap adjustment.

¹³ Bill Holly K1BH (personal communication) considers many sideswiper keys as essentially a strap-key suspended in a vertical position. The idea is most interesting: could the strap key model have given rise to such a variation, even if Cootie keys are at some distance in time from the first 1844 strap keys?

But no matter how used or in what context or time frame, what can be said, however, is that conceptually the simple strap key provides a direct link to the May 1844 ‘Correspondent’ strap keys used by Alfred Vail. His ‘Lever Correspondent’ may be the more famous of the two for improving on the simple strap key in ways we can all recognise and benefit from today. But equally, those little strap keys – despite the fact that much of their use-context appears uncertain – are not less significant historically for the direct link they trace to Vail’s very first Morse key. They would ‘bookend’ any collection, with the Vail Correspondent-inspired strap key design at one end, and any modern Morse key of Begali, Schurr or Frattini sophistication one cares to name at the other end. And, truth be told, in their evolutionary simplicity and in their aesthetics, they are quite lovely little keys, if only we reflect enough to recognise and appreciate them...

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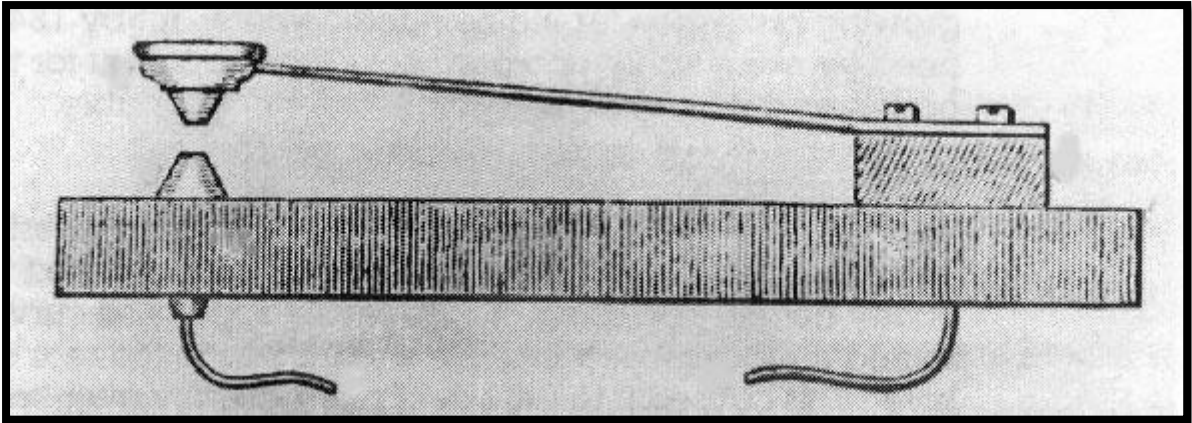


Figure 1 Alfred Vail's 1847 drawing of the May 1844 'Correspondent'.



Figure 2 Alfred Vail's late-1844 'Lever Correspondent' in the Smithsonian Museum

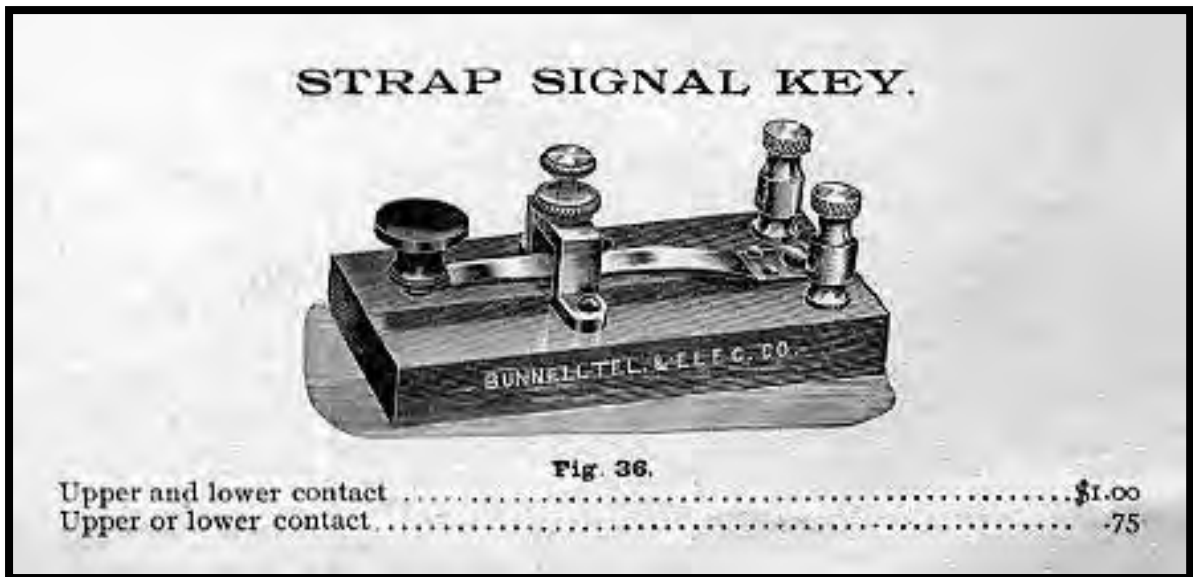


Figure 3 The Bunnell Telegraphic and Electrical Company 1901-04 Catalogue 11, page 20. Note the designation as a 'Signal Key'.

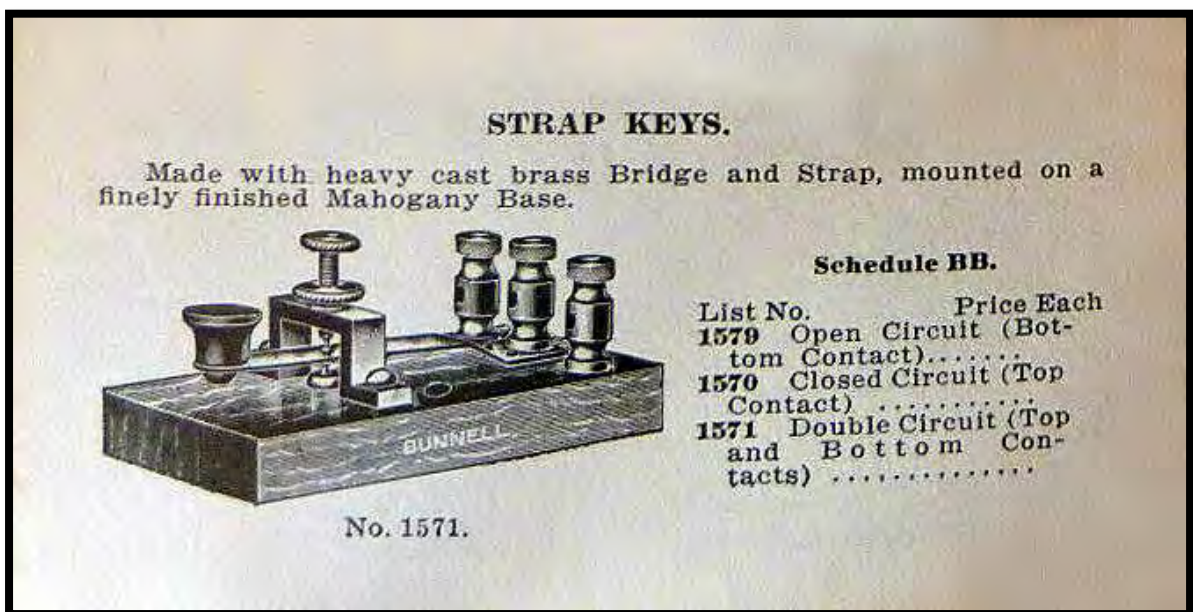


Figure 4 J.H. Bunnell 1918 Catalogue, page 18.



Figure 5 Strap key for telegraphy use. Most likely by J.H. Bunnell. Size 10cm x 5cm.



Figure 6 Telegraphy strap keys. J.H. Bunnell key on stone base at centre. Size 10cm x 5cm.



Figure 7 Foote.Pierson & Co. N.Y. strap key for Western Union Telegraph Company use.



Figure 8 Australian (English?) variant. Laboratory, telegraphy or educational use?
Unknown markings: S.M.&I. Size 13cm x 9cm.



Figure 9 Strap keys used by railroad companies and emergency services. Size 15cm x 9cm.



Figure 10 Strap keys for telegraphy use compared to railroad and emergency services use.

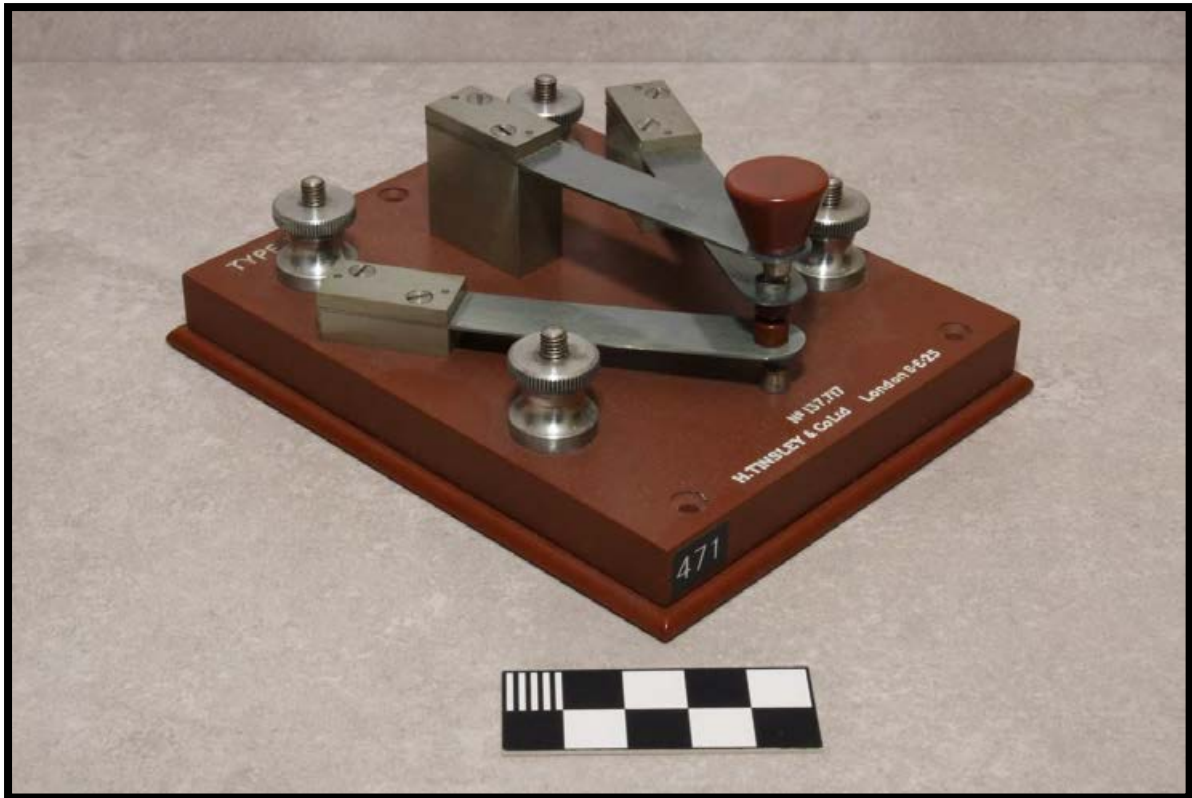


Figure 11 Laboratory test key by H. Tinsley & Co. Ltd. London. Size 13.3cm x 10.8cm.



Figure 12 1942 US Army Signal Corps J-46 Morse strap key for Signal Lamp Equipment EE-84 by Winslow Company (Winslow Electronics). Size 10.2cm x 5cm.



Figure 13 Signs of the passage of time on a circa 120 year old Bunnell 'Strap Signal Key'.



Figure 14 'Strap Signal Key' after conservation. Size 10cm x 5cm. Also see Figures 3 & 13.

Acknowledgements

- Published sources as identified in the footnotes
- Figure 1 Alfred Vail 1847 *op.cit.*
- Figure 2 ©Smithsonian Museum, Washington, internet-sourced image
- Figures 3-4 processed from Internet-sourced images
- All images for Figures 5-12 ©Kees van der Spek
- Tony Rogozinski for offering the author his collection of small and large strap keys which inspired this little paper
- Tom Perera for information about the William Fothergill Cooke manuscript
- Bill Holly K1BH for his thought-provoking ideas
- Herman Willemsen for making inquiries through his networks

Appeal

Should readers have further information on strap keys in any form or shape, please share your knowledge with the author via kees.vanderspek@netspeed.com.au