

KEY AND TELEGRAPH

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Centennial of the Martin Vibroplex

This spring marks the one hundredth anniversary of the commercial introduction of the Vibroplex. I thought it would be appropriate at this time to document in more detail the activities of Horace G. Martin for the months and years leading up to this introduction. In particular, his undocumented experiments that ultimately developed into the Vibroplex. You might be interested to learn that in 1902 he gave his attorney patent drawings for an all-mechanical transmitter that were never filed.

In 1900 Martin, then 27 and still working as a telegrapher, established his first shop at 75 Nassau St. in New York City. He formed a partnership with fellow telegrapher, 29 year old Thomas J. Dunn, operating as the Dunn-Martin Electric Company. Together they did electrical contract work and built a medical shock device for the treatment of telegraphers suffering from “telegrapher’s paralysis.” During this partnership, Martin was working separately on self-adjusting relays and various automatic telegraphy projects including the Phillips Automatic Telegraph System and a typewriter-like keyboard transmitter.

One of Martin’s earliest experiments with a “semi-automatic” transmitter was done at the Nassau St. shop. The instrument used two ordinary Morse keys—one for sending dashes, the other for sending dots. The “dot” key controlled a circuit consisting of a pair of electromagnets and a local battery. The armature on the electromagnets was connected to a long flexible pendulum. This was Martin’s first experiment using a pendulum and he already knew that he could set it into vibration by moving it against a stop with his hand.

When the “dot” key was pressed, the armature pulled the pendulum against the magnet’s cores where it was stopped abruptly, causing it to go into vibration. A contact on the pendulum opened and closed a circuit until the armature was released. The speed was varied by placing an ordinary bind-

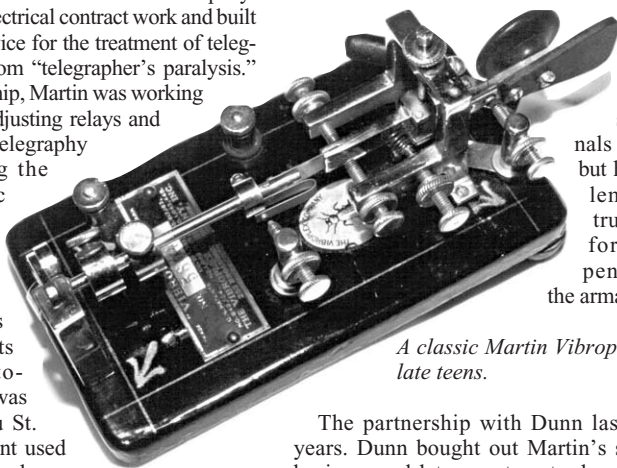
ing post at different positions on the pendulum.

To send the letter “B” one closed the “dash” key first, then quickly pressed the “dot” key allowing the pendulum to generate three dots. Releasing the “dot” key caused the armature to drop and the pendulum was then arrested.

Martin conducted tests of this transmitter on the press wires of the *New York World*, where he was working as a telegrapher. He was particularly concerned with the “carrying” capabilities over long lines. The facilities at the *World* gave him excellent opportunities to test all kinds of telegraph transmitters.

He generally conducted his tests on the St. Louis wire in the middle of the night (around 4:00

a.m.) after he came off duty. His transmitter produced strong signals to St Louis but he had problems with the trunnion seats for both the pendulum and the armature.



A classic Martin Vibroplex from the late teens.

The partnership with Dunn lasted for two years. Dunn bought out Martin’s share of the business and later went on to develop his own semi-automatic transmitter called the Dunduplex. The model of Martin’s early experiment was kept by Dunn in box of junk from the Nassau Street days and still existed as of 1906.

In early 1902, Martin moved to Bridgeport, Connecticut to work as an assistant to Walter Phillips at the American Graphophone Company. He continued his telegraphy experiments at his residence in Bridgeport and developed his first commercial transmitter, the Autoplex. In September, he moved back to New York and rented shop space from Max Sanger, a model maker, located at 62 Cortlandt St.

Martin filed for a patent on the Autoplex on

October 6th of that year and, with Sanger's help, built and sold "several dozen" Autoplexes from the Cortlandt St. address. The Autoplex was reasonably successful, but was known to the telegraph fraternity as the "battery machine" because of its dependency on a local battery to drive its electromagnets. Almost immediately after filing for this patent, Martin started to experiment with ways to substitute some kind of mechanical motor for the electromagnets. On November 13, 1902, Martin sent patent drawings for a new all-mechanical transmitter to A.M. Wooster, his Patent Attorney, in Bridgeport, Connecticut. Martin wanted him to apply for a new patent, as an improvement on his Autoplex, as soon as he could come up with the necessary funds.

During the time he was developing these instruments, Martin was not always in a financial position to take out patents on every improvement, even with help of Walter Phillips. He asked Wooster how much it would cost to file for a caveat and/or a second patent. Wooster advised him not to waste his money on a caveat and just patent the invention but it would cost Martin about \$85.00.

Referring to Martin's handwritten drawing shown here, the shaft of a toothed wheel is turned by any suitable means, such a spring motor or kicks from a clock's pendulum. The wheel is held in restraint by the key lever. Pressing the lever to the right releases the wheel permitting it to turn.

The teeth of this wheel push a contact spring towards a fixed contact to produce dots. Pressing the lever to the left stops the wheel and further pressure extends the flexible portion of the lever causing the circuit to close for the duration of a dash. A model of this key was built in early 1903 but was unfortunately not preserved. Martin tried two other ways to produce dots while at Cortlandt St. One method used a clock mechanism with a pendulum; the other used a flywheel.

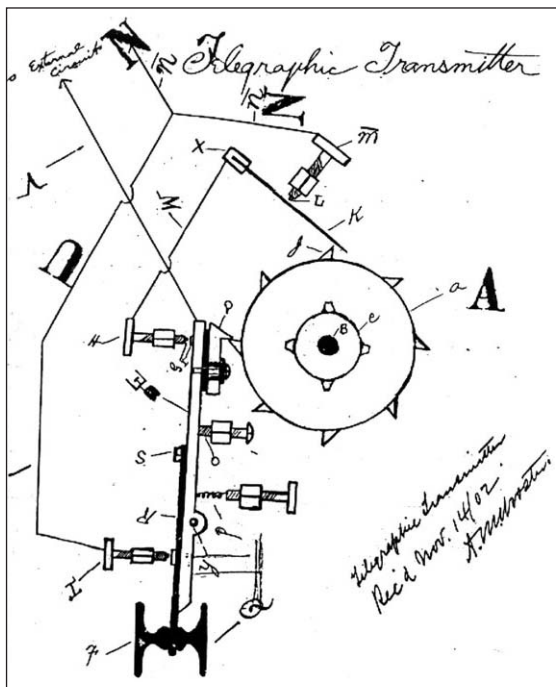
He originally purchased an enclosed clock movement from Sanger with hopes of incorporating it in his Autoplex. But in early 1903 he used it in a separate model where a pendulum was driven by the escapement of the clock. When the clock mechanism was set in motion, the escapement caused the pendulum to oscillate back

and forth opening and closing a circuit producing dots. He placed a weight at various points on the pendulum to see if the it would produce firm signals at a uniform rate of speed. He also tried substituting a small toy hot air engine for the clock, but had problems with overheating.

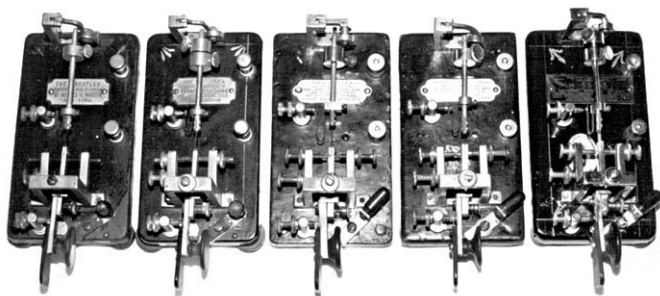
In another experiment, Martin mounted a small ratchet wheel on the same shaft with a flywheel. On one end of a centrally pivoted key lever were finger keys. On the other end was a rack which was normally held out of engagement of the ratchet wheel. Moving the lever to the right engaged the rack with the ratchet wheel causing the flywheel to spin. The shaft had a contact that opened and closed the circuit as it spun around. Martin conducted several experiments with these principles, using parts from one instrument to build another.

In a second letter to Wooster dated Nov 29, 1902, Martin says he is "swamped in getting things going." What is notable in this letter is that Martin makes mention of developing a "Wireless Telegraph System." Wooster had asked Martin how the system was going and was very interested in learning more about wireless technology.

Martin's reply was, "I expect to take up the



Martin's never-filed 1902 patent drawing for an all-mechanical transmitter.



Samples of the basic design, later called the "Original Model," changed little over the years. Here, left to right, are representatives from the years 1905-1920.

system again in the near future and should I have a little luck in conjunction with a very pretty theory I suppose we will have to call on the patent office again." (He experimented for many years with wireless but no patents were issued.)

Martin worked at Sanger's shop until June of 1903, and in addition to building the Autoplex and conducting his experiments, he was perfecting the Phillips System and doing general electrical work such as repairing and wiring. He then moved his shop to 53 Vesey St. where he continued his experiments while still working as a telegrapher.

1904 was a critical year for Martin as an inventor. In February, the United Electrical Manufacturing Company was formed as a organized effort to market the Autoplex. Martin became the general manager of both sales and manufacturing and his 53 Vesey St. shop was upgraded.

In the months preceding the formation of UEM, Martin was preoccupied with his experiments and failed to anticipate the competition that was forming. In January of 1904, William Coffe, a telegrapher from Ohio, filed for a patent for an all mechanical, motorless transmitter called the Mecograph.

In April of 1904, Martin inspected two transmitters manufactured by the Mecograph Company at their dealer's store in New York City. There were two Mecographs on display. One had a vertical pendulum, and the other had a horizontal pendulum "contained in a small metal case." Both were marked "patents pending."

The following month, on May 7, 1904, Martin filed for his second transmitter patent as an improvement to his Autoplex. The patent included one design for an all-mechanical, motorless key. It was granted on August 9, 1904. (767,303). However, Coffe's earlier filing date would come back to haunt Martin.

Even though Martin is credited with inventing the art of semi-automatic telegraphy with his Autoplex, Coffe gets credit for inventing the first all-mechanical motorless key. Martin was later criticized by Mecograph on the grounds that this

August 9th patent was a "paper patent;" no practical instrument was ever produced from it. He was accused of hastily putting it together after seeing the two transmitters at Mecograph's dealer store in New York.

Also, they thought the patent was granted quickly because of the limited scope of claims (just three) made by Martin in his application. Martin's patent called for a lever that released a restrained vibrator to produce dots in a similar manner to the technique described in the Coffe patent. However, Martin's one-piece lever was productive in two directions; moving it to the right produced dots and to the left a dash.

In Coffe's patent, the lever was productive in only one direction—to the right for dots. A separate dash lever made out of a leaf spring was attached to the side of the main lever. The operator pressed this lever to the left against the main lever to produce a dash. The patent office, and subsequently the courts, ruled this small difference in Martin's design "exhibits a patentable invention."

Martin used the period from August 1904 to early 1905 to develop these ideas into the product that would become the Vibroplex and to prepare UEM's factory for its introduction. In a later lawsuit between UEM and the Mecograph Company, Martin's lawyers stated that the Vibroplex was not manufactured until "some time in 1905."

This is also evident in the trade publications for the period. One week after Martin was granted his August 9th patent, a small business sketch about him appeared in *The Telegraph Age* on August 16, 1904. It credits Martin with receiving patents and highlights the Autoplex, but there was no mention of a new mechanical transmitter.

In January of 1905 UEM was still advertising the Autoplex and making no mention of the Vibroplex. On May 16, 1905, in another business notice, UEM announced the enlargement of its operation at 53 Vesey St. "owing to pressure." Two large lofts in the building were now devoted to manufacturing.

Among the products listed in the notice were the Martin Autoplex and, for the very first time, the Martin Vibroplex. An invitation was also extended to inspect UEM's products at the Railway Telegraph Superintendents Convention to be held on May 17th at the Read Hotel in Chattanooga, TN (a major trade show).

Published convention reports show that a Martin Vibroplex was on exhibit and was "carefully looked into by all interested." This appears to be the very first public showing of the Vibroplex. UEM and at least one of their agents began advertising the Vibroplex the following month. Martin later filed for a patent that is truly representative of the Vibroplex on April 16, 1906.

The labels on his early production models of the Vibroplex were stamped, "Patented August 9, 1904." The courts would later agree with Martin's reasoning for doing this stating, "we are of the opinion that Martin conceived the particular instrument shown in the patent (August 9, 1904) and reduced it to practice before he began to manufacture it for sale."

Horace Martin's Vibroplex affected the careers of thousands of telegraphers and radio op-

erators for decades and is used, admired, and available today. Considering the endless stream of treasures from the attics of America showing up on Internet auctions, it seems likely that examples of the Martin Vibroplex will still be around for the product's Bicentennial. 

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About Our Authors

DAN MERZ

*Building a Replica Magnetic Detector
(In "Breadboarding")*

Dan graduated from Stanford in metallurgical engineering in 1961. He then received a M. Met. degree from Sheffield University, England. Later, he returned to Stanford for a doctorate in Materials Science. Dan subsequently spent two years at University of California, Berkeley, doing research on high strength steels. He retired from Battelle Pacific Northwest Laboratories in Richland, WA, where he worked on plutonium metallurgy and vacuum sputtering of advanced materials. Dan's radio interest started with SWLing on the family Philco console. He has seriously collected and repaired old radios for about 20 years. The collection now numbers about 200, including early battery sets, crystal sets, boat anchors, and regenerative shortwave sets as well as an assortment of 30s radios. Dan is a member of the Puget Sound Antique Radio Association in Seattle.



ROBERT MURRAY

Re-Creating Reginald Fessenden's Liquid Barretter
Robert retired recently as Professor, Commu-

nity Health Sciences, University of Manitoba, but still keeps his hand in. Note the absence of any link to the electronics industry. His hobby career in antique radio follows a more or less typical series of evolutionary stages. He began about 25 years ago by collecting almost everything in sight. After a decade or so he decided to focus his collection on Canadian-made broadcast receivers of the 1920s. Three years ago he donated the Canadian items in his collection to Canada's National Science and Technology Museum. His acquisitions have now slowed to a trickle, and he directs his attention to documentation of the history of early Canadian radio manufacturing and related topics. The next phase will be...



BOB RAIDE, W2ZM

A Simple "MOPA" Adapter for the 1929 QSO Party

Bob has held an amateur radio license since the age of 13. He has also had a long-time interest in broadcasting and earned a First Class Phone ticket at age 16. Now, at age 60, he enjoys the hobby and the broadcasting business as much ever. Though retired from the family business as of last year, he remains in broadcasting with a capable partner. He operates in three upstate New York markets: Syracuse, Utica, and Al-