

Omnigraph Code Practice Machine

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No. 773,374.

PATENTED OCT. 25, 1904.

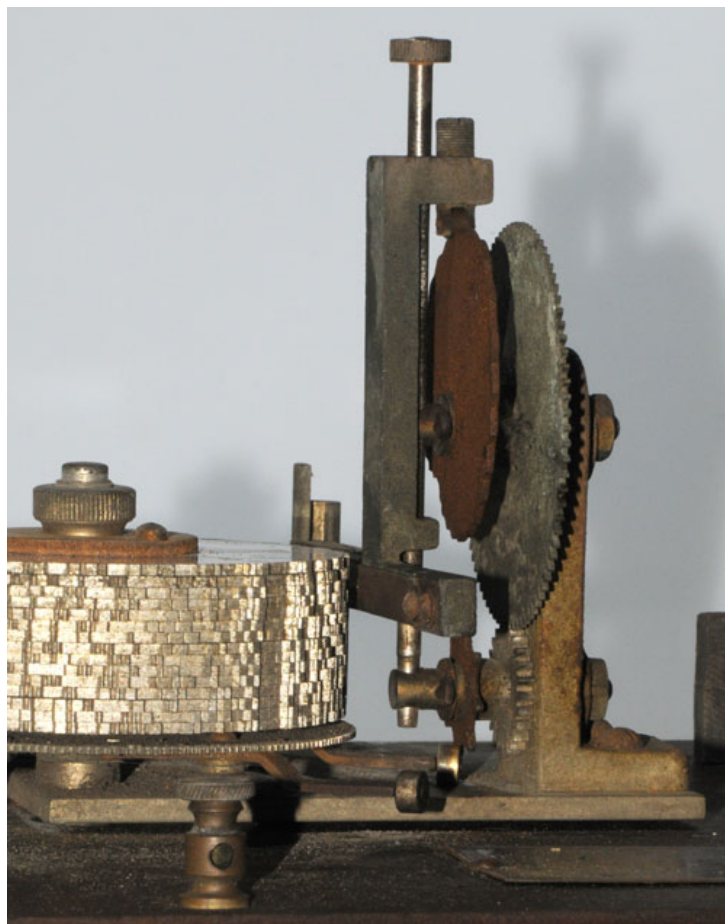
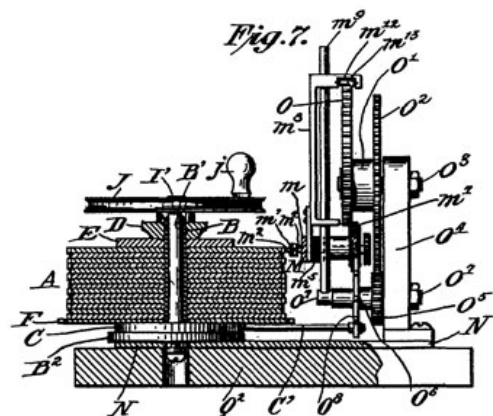
G. E. CHINNOCK.

INSTRUMENT FOR THE TEACHING AND PRACTICE OF TELEGRAPHY.

APPLICATION FILED JAN. 20, 1902.

NO MODEL.

3 SHEETS—SHEET 3.



Omnigraph No. 2 Junior

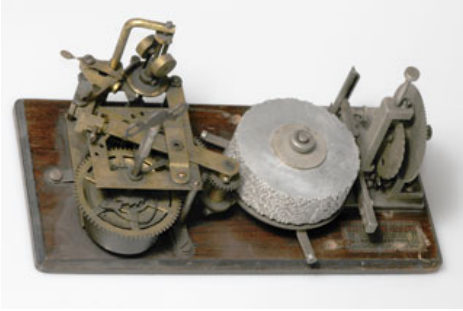


Omnigraph No. 2 Junior

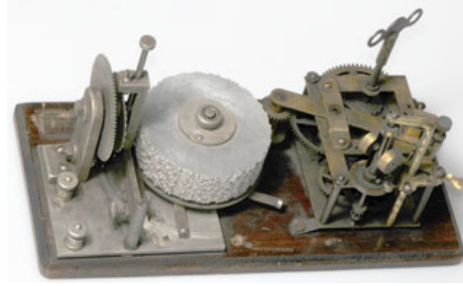
Bad Motor - missing fly ball regulator



Omnigraph No. 2 Front (ISO=200)



Omnigraph No. 2 Back



Omnigraph No. 2 Front (ISO=800)



Omnigraph No. 2 Motor Left


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Background

There are a number of different models of the Omnigraph code practice Instrument. There are two major components of the Omnigraph, the brains of the machine is shown in the patent as Fig 7 and is the part that generates the mixed Morse code groups. The most common versions are the 5 and 15 disk stacks. The heart of the machine is either a governor regulated clockwork or an electric motor.

These were advertised in magazines like Popular Mechanics and were used by the U.S. government organizations that administered the Morse Code tests until the 1930s.

These two parts typically would be assembled on a wood base along with accessory items like a manual Morse key, a sounder (Telegraphic code), a buzzer (international code) and other items to make up a code practice set. Some of these were factory assembled as standard products or were factory assembled as customized for a specific customer. My first Omnigraph was one of these and it's label reads:

The Omnigraph Automatic
Transmitter
M'd. Expressly for
The N.Y. Wireless Institute
258 Broadway
New York, N.Y.



Description

This is a machine that uses a disk (A) that actuates an electrical contact to generate Morse code for practice. During the rotation of a disk the circuit breaker (m) can move up or down (gravity feed) on rod (m^9) so that the next upper (if moving up) or lower (if moving down) is used. The cam (O) controls the height of the circuit breaker (m). There are five arms (C') under the stack of disks that engage a star wheel (O^8) which through pinion wheel (O^5) and Gear Wheel (O^2) which drives the cam (O).

Patents

Class 178/115 is Telegraphy/Learner's Instruments and includes items that would be used in a class room setting with an instructor sending code as well as instruments that generate code for home study.

Class 178/83 is Telegraphy/Code Transmitters/Rotary Contact

Wheel Type

An advantage of wheel type code generators is that most of them have a provision to allow changing the characters that will be sent so the person using the machine will not know what the message is even though they setup the machine. Some wheel type telegraph transmitters were intended to allow an unskilled operator to send Morse, but that's not as good as having an unskilled operator punch a paper tape that's then transmitted by a high speed reader, so they were not too popular. They were known and probably were the source of an idea to make the disks for learning code.

[452026](#) Electrical Signaling Device, C.J. Kinter, May 12 1891, **178/83** 340/6.14 341/173 - oldest patent in class 178/83

intended to send specific characters to be used with patent 435983 Electrical Traction Apparatus - for controlling a plow in a field, not for learning code, but does use multiple wheels and followers.

[524635](#) Telegraphic Transmitter, F.F. Howe, Aug 14, 1894, **178/83** 185/39 - one key for each letter of the alphabet (unskilled operator can send Morse)

[530957](#) Finger Board Telegraph Key, E.E. Mullinix, Dec 18, 1894, **178/83** - 3 rows of 14 keys like a typewriter for unskilled operator to send Morse

[515709](#) Telegraphic Instructor, T.J. Houck & H.M. Browning, Feb 27, 1894, **178/84** 178/115 434/222 - drum with insertable lugs

[736936](#) Instrument for Teaching and Practice of Telegraphy, C. E. Chinnock, Aug 25, 1903, **178/115** ; 178/83

The filing date was Apr 27, 1901

hand crank turns single wheel and sends same sequence

[773374](#) Instrument for Teaching and Practice of Telegraphy, Charles E. Chinnock, Oct 25, 1904, **178/115** ; 178/83

motor driven with a stack of code wheels.

[847921](#) Omnigraph, J.W. Earless, Mar 19, 1907, **178/115** ; 178/85 - key handle swings left-right

[1343754](#) Apparatus for Teaching Codes as used in Telegraphy, C.R. and R. Woodland, **178/115** ; 178/17R - multiple disks and multiple followers

[1479688](#) Telegraph Transmitter, F.W. Wright, Jan 1, 1924, **178/115** - 24 character wheels with 15, 16 & 17 teeth to generate more random code.

Paper Tape

Paper tape could be punched then taken to a reader that would send it at speeds much faster than an operator could (both in terms of sending and receiving) in order to get more capacity from a given physical line. But paper tape could also be used for practice.

This idea was also used with the [GRA-71 Coder-Burst Transmission Group](#).

[213779](#) Automatic Telegraphs, A. G. Ryder, Apr 1, 1879, **178/115** - a clock frame modified to drive single track paper tape.

[336284](#) Learner's Telegraphic Instrument, E. Bonsall, Feb 16, 1886, **178/115** 178/3 - single track paper tape

[449655](#) Telegraphy, AL, GH & H Anderson, Apr 7, 1891, **178/17A** 178/115 - dragging follower of embossed paper tape reader (most were lifting followers)

[491595](#) Telegraph Transmitter, R.S. Roberts, Feb 14, 1893, **178/17A** 178/115 - expressly for learning (low speed and accurate)

[2857460](#) Telegraph Code Practice Keyer, R. Hell, et al, Oct 21, 1958, **178/115** ; 178/17R - On & Off tones + center index holes.

The Omnigraph Instruments by Dave Pennes

Students learning Morse code have had a variety of commercially made practice instruments available to them over the years to assist in their studies. Such devices included purely mechanical sounders that simulated the audio of a working sounder (fig. 1), inexpensively made sounder/key combination sets identical in function to the more robust instruments for commercial use, a variety of perforated tape devices such as the Instructograph, Teleplex, AA Transmitter, and others, a rotating painted cylinder device called the 'Natrometer' (fig. 2), as well as a variety of 78 RPM and later 33 RPM records and tapes.

Fig. 1: "No. 1 Mechanical Telegraph Instrument" is the name for this device in the 1912 J.H. Bunnell catalogue. Bunnell made another variety of mechanical sounder, and a number of other manufacturers also made such purely mechanical instruments including Manhattan Electrical Supply Company, and British companies.

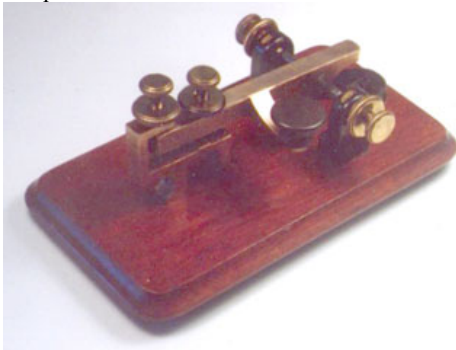
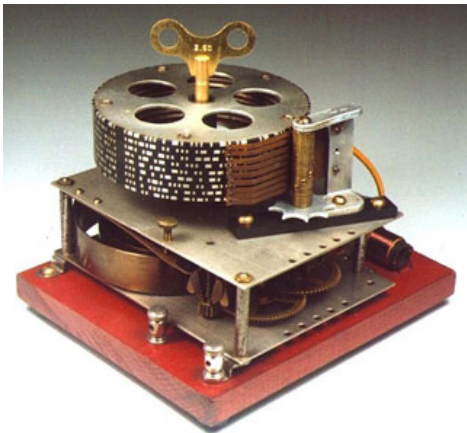


Fig. 2: Natrometer. A clock motor drives a rotating aluminum drum painted in dielectric (insulating) paint. The unpainted surface is in the shape of continental code characters. A stylus in contact with the surface of the drum automatically travels from one line of Morse code to the next higher line and then back down the lines of code.



Current generation Morse code practice instruments employ microprocessorcontrolled random character generators capable of almost any sending speed. PC based software programs for learning Morse code are also widely available. Among the most unusual Morse code practice devices were those manufactured by The Omnigraph Manufacturing Company in New York City between 1900 (1) and 1931 (2). As best as can be determined, the Omnigraph company never produced anything other than Morse code practice devices, and did not produce commercial devices such as telegraph keys or sounders of any sort. Omnigraph advertisements were featured in numerous telegraph, radio and electrical publications of the day including QST, The Wireless Age, Modern Electrics, The Electrical Experimenter, Journal of the Telegraph, Radio, Electrician and Mechanic and probably others (3). Omnigraphs were also marketed by major retailers of the day including Sears and Roebuck, J. H. Bunnell, Manhattan Electric Supply Company (‘MESCO’), and Wholesale Radio Service Company (New York City). The factory occupied several different New York City addresses over the 30+ year span of the company existence, judging from the addresses listed in the numerous advertisements during this time period. The 1914 and 1919 U.S. Department of Commerce rulebooks stated that commercial and amateur radio license examinees undergo a code test that: “shall consist of messages with call letters and regular preambles, conventional signals and abbreviations, and shall in no case consist of simple, connected reading matter. The test will be conducted by means of the Omnigraph or other automatic instrument wherever possible (4)”. The demise of the company and its unique instruments was undoubtedly related in part to the superior capabilities, versatility, and reliability of perforated tape devices such as the Instructograph. As dazzling as Omnigraphs were to watch in use, they were finicky and temperamental instruments to use. The multi-disc Omnigraph devices (see below) although ingenious in design, allowed for, at best, pseudo-random code generation, limiting overall utility. Although company advertisements boasted a 45 minute running time on a single winding, a properly functioning and adjusted instrument would begin to slow noticeably after about 20 minutes running time (5).

The Instruments

The company manufactured a number of instruments of varying complexity, all of which had rotating aluminum discs with Morse code characters incised into the edges of the discs as raised teeth. As the disc rotated, a tracking stylus in contact with the teeth was displaced by the raised teeth, and allowed an electrical contact to make and break a circuit, producing the Morse code characters. The instruments varied only in whether the discs turned by use of a hand crank or were motor-driven, and in the numbers of discs that could be stacked, necessitating a cam mechanism which raised and lowered the tracking stylus in the multi-disc models. Some instruments included keys, sounders, or buzzers integral to the devices, although the company also sold ‘stand-alone’ sounders, buzzers, batteries, and hookup wire produced by other manufacturers as accompaniments to their instruments. A student could purchase the Omnigraph instrument alone, however for a few dollars more, the student could obtain a package that included a learner’s manual, a battery, a sounder or buzzer, some wire, and a straight key. Although the company advertisements described 5 models of Omnigraphs, (Table 1), in reality, at least 15 distinct instruments were advertised or produced over the years.

TABLE 1: Omnigraph Company Instrument designations

COMPANY DESIGNATION	DESCRIPTION	VARIATIONS
No. 1 Omnigraph	Transmitter only or transmitter/KOB combination	Two versions (figs. 7,9)
No. 2.Omnigraph	5 and 15 disc versions	5 disc model-four types (figs. 12-15). 15 disc model-six types (figs. 19-24.)
No. 3 Omnigraph	Single disc transmitter model with hand crank.	One version (fig.8). Similar to Omnigraph No. 1 (fig.7) but larger size wooden base.
No. 4 Omnigraph	5 disc model with key, buzzer, and provision for headphones	Two versions, (included in No. 2 variations, above). (figs. 13,15)
No. 5 Omnigraph	Single disc model with hand crank and clock motor	Two versions (figs. 10,11)

The instruments were mounted on wooden bases, which on most models measured 5” X 10-1/2”. Many but not all instruments bore a company identification label. Some were decals applied to the wooden bases while others were metal tags attached by small pins hammered into the wooden bases.

The company supplied Omnigraphs to others who affixed their names to the instruments including the National Wireless Institute (a study-at-home correspondence school) in New York City, and A. W. Gamage, Ltd., London. Most Omnigraphs have the notation ‘Patented’ or ‘Pat.’ embossed into the wooden bases. A c. 1910 Omnigraph catalogue has a diagram of a No. 5 instrument bearing the patent date Oct. 25, 1903. The only instrument with a patent date encountered by the author was a 5-disc instrument bearing the patent date of Oct. 23, 1904. To the best of the author’s knowledge, there has been no research on the patents held by the company nor on the individuals who designed instruments. Discs The unique feature of the Omnigraph instruments is the use of rotating aluminum discs with raised teeth on the edge in the shape of the actual Morse code characters. Discs were of at least 3 different types (figs. 3-5) and a fourth type that appeared in an advertisement (fig.21) but which has never been seen by the author.

Fig. 3: A typical disc from a multidisc instrument. Notice the 5 concentric holes in addition to the central spindle hole. In use, besides the central spindle post, a second post must be fitted into one of the 5 holes to align all the discs in the stack in a uniform manner to allow for coherent messages that were spread over more than a single disc. This disc is marked 9-O, representing the 15th disc of the 9-series of discs. (The letter ‘O’ is the 15th letter of the

alphabet). Transcription of the Continental code reads: "SEE SILAS FLA HEY ABOUT 5 AND 35 SIG W LEE"



Fig. 4: A typical disc used on a single disc Omnigraph instrument. A single central spindle hole holds the disc onto the rotating platter. This particular disc is marked "6". Transcription of the American Morse reads: "HR STMH FM NEW YORK 21 TO ADH. YES SIG LH"

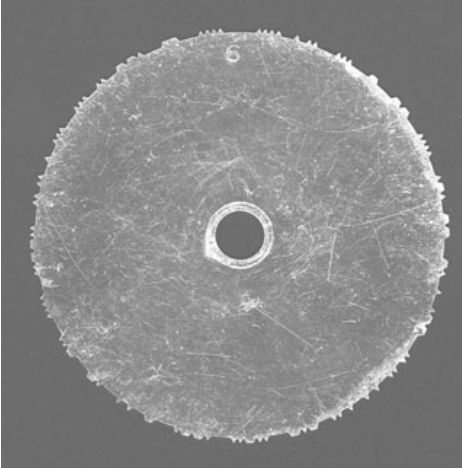
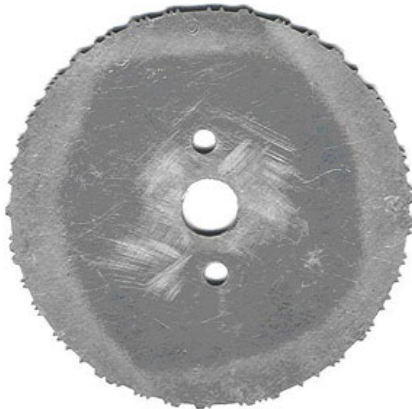


Fig. 5: An unusual disc, with a central spindle hole and two alignment holes. This disc is one of a complete set of 15 found on the instrument shown in [fig. 23](#). This disc is the last disc ('O') from the series, and bore no numerical designation. The character consisting of 4 short dashes at approximately the 2:00 position on the disc is the Morse character denoting a new paragraph (6). Translation of the Morse message reads: "ON SALE CAN YOU SEE? ANSWER SIG L RICHARDS"



The discs were all 3-1/8" in diameter and were either thin (1/32") or thick (1/16"). Thin discs were used on the single disc instruments, and had a single central hole for the spindle, whereas thicker discs were used on the multidisc instruments, and had alignment holes in addition to the central spindle hole. Close inspection of the discs indicates that production involved cutting the discs, analogous to a locksmith duplicating a key. Such an arrangement would produce a disc with closer dimensional tolerances than stamping discs from a die.

Discs were available for both American Morse and Continental code. The number of characters on any individual disc varied from 12 to 36 ([4](#)) with the lower number of characters allowing for slower code speed in the beginning lessons and the closer spaced characters for more advanced lessons. The speed of rotation of the discs, of course was user modifiable, allowing further control of sending speed. Code was sent using the 'Farnsworth Method' indicating that the individual Morse code characters were uniform in dot and dash length and spacing with slower code speeds achieved simply allowing more time between individual characters. The thicker discs could be used on the single disc instruments but the thinner discs were physically incompatible with the multi-disc mechanism, which required a second alignment hole. Practice sessions included code groups, random characters, numbers, punctuation, and short messages ([fig. 6](#)).

Fig. 6: Transcription of the full disc series of Continental code for the 7-series of discs. (Transcription courtesy of Mr. Lynn Burlingame N7CFO).

7-A	III SS AS HOOKER OFF LB NJ SEPT 15 TOT
7-B	BROWNS OPR STR BRITTON VIOLENT RAIN AND
7-C	WIND STM RAGED AT ASBURY SE OF US THIS MNG
7-D	DAMAGED THE TOWN AVON. 2 LIVES IN PERIL
7-E	BY FIRE ON SHIP KENNEDY BEACHED HERE. B
7-F	GEO DENTY KEY ESCBETTS FRANK R. MILLERS
7-G	JOE TEER JOHN Z. WORTON SAMUEL T. CORBIN
7-H	NAMES FM POCKET OF ROB BENTLY SAVED,
7-I	TURKISH HUSSARS ARRESTED WHILE AT SCUTARI
7-J	MAN. Q HIGGINS ON STEAMSHIP XE MEYER.
7-K	RECD FM HATTARAS WED. 5 AM SEVENTEEN HUNDRED
7-L	WT IS ZN HOPING FOR ? S FORD IS A VYGD
7M	. IT WAS STATED IN ADVICE S. MURAD WAS PUT
7-N	TO DEATH D'S NO IS 496 ADSMEAT 370N
7-O	SEA-AIR AVE 7 AM (SIG C HAROLD EBLIN.

Discs that were used on multidisc instruments (5 or 15 disc models) were designated with an alphanumeric numbering system consisting of a number followed by a letter between A and O accounting for the 15 discs in the series. Other discs ([fig. 4](#)) were designated simply by a number. A set of 15 discs exists that is labeled A through O with no number designation ([fig. 23](#)).

It is not known with certainty but it is suspected that the discs for single-disc instruments were numbered whereas the discs for instruments employing multiple stacked discs bore the alphanumeric designations. Alphanumeric discs are known up the '9' series however it is unknown if more than 9 sets of discs exist. The lowest numbered series of discs (series 1 and 2 for example) had simple code groups whereas the highest numbered series ([8](#) and [9](#)) had more complex messages including numbers and punctuation characters.

Nine sets of 15 discs may exist for both Morse and continental code for a total of 135 discs for each code. The highest numbered disc encountered by the author is '19', suggesting that at least 19 numbered discs exist.

Discs from the "2" series exist for both Morse and Continental code, and transcription indicates that the messages were completely different indicating that the Morse and Continental code discs were not simply the same messages in Morse and Continental code.

Morse discs were identical in appearance to Continental code discs and the company made no attempt to differentiate one from the other based on appearance. The only way to tell Morse from Continental discs is to visually inspect the discs, looking for the characteristic Morse characters that were distinct from the continental code characters.

In addition to the discs that were included with the initial purchase of the instrument, additional discs could be obtained at modest cost. The company also permitted students to exchange their discs for different ones for a 2 cent per disc postage and handling fee. If one ordered 5 extra discs for a 5 disc instrument, it is suspected that the student would receive the first, second, or third set of 5 discs of a 15 disc sequence.

Transcription of the discs has demonstrated that sometimes the company mislabeled the discs. A 7-L disc owned by a collector is the same as a 7-I disc in the author's collection. Other collectors have other discs with the same messages on discs with different alphanumeric designations suggesting incorrect labeling. The author has several alphanumeric discs with the letter crossed out and another letter stamped next to it as a correction. Another disc has the letter designation on the disc upside down. The finding of inconsistent and erroneous labeling of discs suggests that disc labeling was not automated, and that human errors were not rare in labeling discs.

The author's experience and the anecdotal experience of other collectors is that most discs encountered are the thicker discs used in the multidisc instruments. The 6 thin discs in the author's possession are all American Morse.

The Clock Motors

Another feature of some of the Omnigraphs is their use of a spring-driven windup clock motor. An interesting adaptation is the use of a flying-ball governor mechanism to maintain constant speed in the face of a marked increase in the instantaneous loading, as when the stylus tracking mechanism moved from one disc to a higher disc in a stack. In reality, the sending speed slowed as the tracking stylus moved to a higher disc, and frequently would flub the first character on the higher disc. As the stylus descended the stack of discs, frequently it would skip the adjacent disc and track to a lower disc, although this may have been secondary to wear on the cam mechanism. The clock motors on different instruments varied slightly in design over the years but all had the flying ball governor, and a friction speed control mechanism. An experienced clock repairman indicated to the author that the clock motor resembles a Seth Thomas clock mechanism of the era with the addition of the governor, and that most likely Seth Thomas provided the clock drives to the Omnigraph company. The motor mainspring is presently an off-the-shelf item from clock repair parts sources and can easily be obtained and replaced on existing instruments if needed.

The Simplest Omnigraph

The simplest Omnigraph device consisted of a single disc mounted on a platter which was rotated by use of a hand crank ([fig. 7](#)).

Fig. 7: "Omnigraph Transmitter No. 1", the simplest device the company produced. The user had to supply his own battery, buzzer or sounder, wire, and key.



Advertisements in 1909 listed this model as "The Omnigraph Transmitter No. 1". The single disc supplied with the instrument had American Morse characters which sent the nonsense statement: JOHN QUICKLY EXTEMPORIZED FIVE TOW BAGS, which incorporates all 26 letters of the alphabet into one sentence. No numerals or punctuation were included. An instruction booklet "How To Become An Excellent Operator" was included with purchase of the device. Additional discs could be purchased for 5 cents each.

The same device on a larger base was known as "The Omnigraph #3" in a c. 1910 catalog ([fig. 8](#)).

Fig. 8: "Omnigraph Transmitter No. 3" is the same instrument on a larger wooden base. From a c.1910 Omnigraph Company catalogue.



Omnigraph KOB

A device similar to the simplest Omnigraph (above) incorporated an inexpensive sounder and key identical to the J.H. Bunnell "Morse Learners' Outfit" advertised in the 1900 Bunnell Catalogue, and were undoubtedly supplied to Omnigraph by Bunnell. ([fig. 9](#)).

Fig. 9: Omnigraph transmitter with integral key and sounder. This instrument is missing the hand crank used to turn the platter containing the disc.

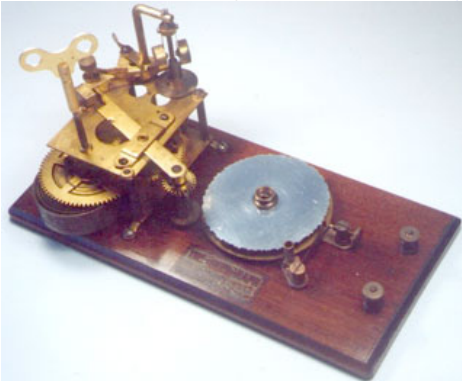


There was no separate model number for this device, and it was regarded as a version of "The Omnigraph Transmitter No. 1." The 1903 MESCO catalogue listed this device as "Omnigraph Learner's Set". A 'press release' in the April 16, 1901 issue of The Telegraph Age described this device suggesting that it may be the first instrument produced by the company.

Single Disc Omnigraph with hand crank and motor

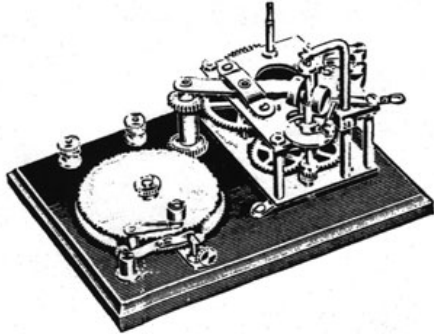
Due to the inconvenience of having one individual hand crank an instrument while another listens to the code, (or even worse, trying to crank it yourself while attempting to copy Morse code), the company supplied a device that allowed both for hand cranking and motorized disc rotation ([fig. 10](#)).

Fig. 10: "Omnigraph No. 5" is the company designation for this model. At \$7 around 1915, it came with a total of 3 discs and a learner's manual. This instrument is also missing the hand crank as is [fig. 9](#).



The logic behind supplying such an instrument is unclear, inasmuch as the hand-cranked mechanism would seem completely superfluous in the face of the convenience of motorized use. Despite the ease of having automated disc turning, the user was still limited to a single disc at a time, and by having to change the disc after every use. It must have been very tedious for the student to listen to the same disc over and over, and to have to change every disc by hand. It is speculative, but undoubtedly at least some students thought to turn the disc over, thus playing the disc backwards, generating new characters. The letter A (-) for example would then become N (-). A c. 1930 company catalogue illustrated a slightly different version of this instrument on a smaller base and with a more compact design ([fig. 11](#)).

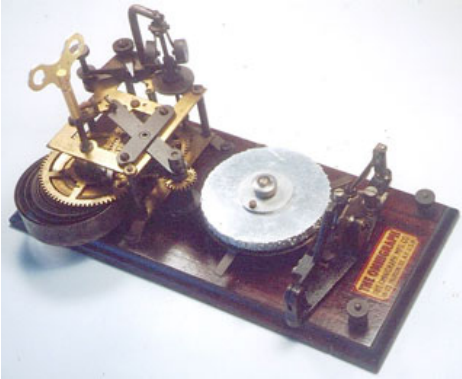
Fig 11: "Omnigraph No. 5" on a smaller base with more compact design than [fig. 10](#).



Five Disc Model

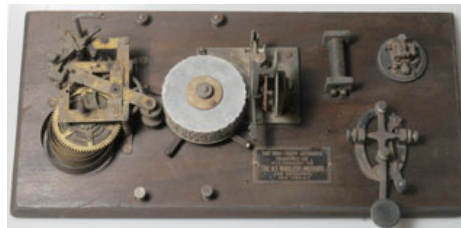
The 5 disc model was designated "Omnigraph No. 2 Junior" in the 1924 J.H. Bunnell catalogue. The five disc model ([fig. 12](#)) was probably the most popular model (4), and incorporated the clock motor, a stack of 5 discs, and a cam mechanism to move the stylus from one disc to the next higher disc.

Fig. 12: "Omnigraph No. 2 Junior" is the company designation for this model, and is reported to be the most popular model sold ([4](#)). A buzzer was included in the purchase price of \$12.50, or for \$14 the device came with a key and sounder, battery, wire, and a learner's manual.



When the stylus arrived at the highest disc, it would travel down the stack again from the highest disc to the lowest disc and then ascend again. An adjustable mechanism allowed the user to decide whether to play the entire disc before moving to the next disc in the stack, or to play a segment of the disc before moving to the adjacent disc. 1/5, 2/5, 3/5, 4/5 or the entire disc could be played before moving on to the next disc. By allowing less than a full disc to play before moving to the next disc, the user could create nonrepeating messages much longer than the sum of all of the characters on the 5 discs. For example, if the user wished to play only 2/5 of the disc before moving on to the adjacent disc, then when the disc reached the highest level, it would begin to descend down the stack of discs again, and would play a different 2/5 segment of each disc on the way down. At the lowest disc, the stylus would begin to ascend the stack of discs again, this time playing a 1/5 segment of the disc that had already been played with the last 1/5 segment of the disc that not been played. This ingenious pseudo-random character generator design would allow continued playing of different 2/5 disc segments for many, many hundreds of characters before repeating the message. By adjusting the device to change discs after 1/5 of a disc, then 2/5, 3/5, 4/5 or a complete disc, students could produce a nearly infinite number of non-repeating characters before repeating. Of course shuffling the disc order, flipping the discs over, or rotating one or more of the discs 'out of phase' with each other would allow even more variety. Nevertheless, students may have relatively quickly memorized segments of discs, diminishing the utility of the device as a learning tool. The company also manufactured a 5-disc device with a key and buzzer ([fig. 13](#)).

Fig. 13: Omnigraph No. 2 Junior with integral buzzer, key, and provision for use with earphones.



The governor is missing from the spring motor as is the cover for the buzzer.

Advertisements for the 15 disc version of this device show earphones being used. The small cylindrical object next to the buzzer is a primitive coupling

transformer for use with the earphones described in a c.1930 company catalogue as “induction coil #21”. The primary winding is in series with the buzzer, and the secondary is connected to the earphone terminals. The audio heard in the earphones would be the same frequency as the buzzer and would be expected to mimic the raspy audio quality of spark transmitter signals of the era. A similar coupling device is present on the Natrometer ([fig. 2](#)), and is also present on a similar device advertised in a c.1919 Gamage catalogue. The buzzers included on the Omnigraph devices so equipped were almost certainly manufactured by Signal Electric Company of Menominee, Michigan. Another version of the 5 disc model had the discs stacked on top of the motor ([fig. 14](#)) in a compact arrangement.

Fig. 14: Compact 5-disc device. Advertisement from an issue of QST c.1920's



As best as can be determined, there was no separate model designation for this device. A version of this model included a buzzer and key ([fig. 15](#)) similar to [fig. 13](#), and was manufactured for use by the New York Wireless Institute, and which bore their name ([fig. 16](#)).

Fig. 15: Compact 5-disc Omnigraph with integral key and buzzer made for the New York Wireless Institute. (Photo courtesy of Mr. Lynn Burlingame N7CFO).



Fig. 16: Label on device shown in [fig. 13](#).



Although the New York Wireless Institute was a study-at-home correspondence school, advertisements mention an on-site ‘post graduate’ course. It is unknown how many students actually studied at the ‘campus’. Of note, the address of the New York Wireless Institute was 258 Broadway.

Between about 1910-20 the Vibroplex Corp. factory was located directly across the street at 253 Broadway. Students enrolled in the Wireless Institute ‘post graduate’ course of study wishing to purchase bugs could conveniently do so at the Vibroplex factory. Of interest, a c.1930 Omnigraph catalogue listed Vibroplex bugs for sale including the #4 model (“Blue Racer”) for wire work and the #6 model (“Lightning Bug”) for wireless work.

A typical 5-disc model Omnigraph was listed in a c. 1919 A. W. Gamages (London) catalogue ([fig. 17](#)) under the name “The Dictamorse No. 1” and bore a Gamages label ([fig. 18](#)).

Fig. 17: Typical No. 2 Omnigraph listed in a c.1919 Gamage catalogue.



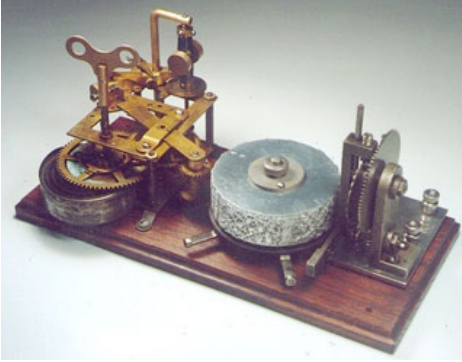
Fig. 18: Detail from fig. 17 showing the Gamage label on the device. The label reads, “A.W. Gamage London”



15 Disc Model

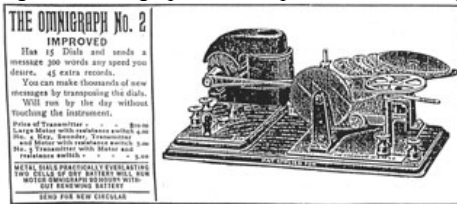
The fifteen disc model was listed in company advertisements as “The No. 2 Omnigraph” incorporating the same driver motor as the other models, but with a more elaborate cam mechanism for changing the discs ([fig.19](#)).

Fig 19: “Omnigraph No. 2” is the name the company gave to the fifteen disc model. This instrument is probably on a replaced wooden base.



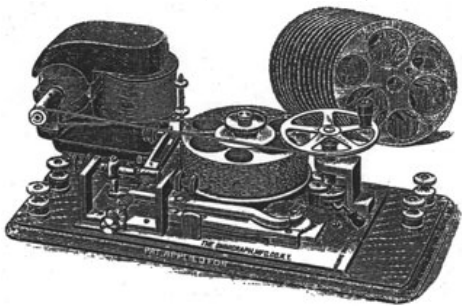
A version of this model advertised in 1909 as “The Omnigraph No. 2 Improved” used a battery powered motor and rheostat in lieu of the wind-up motor ([fig.20](#)).

Fig. 20: “Omnigraph No. 2 Improved” is the company designation for the electric motor driven version of the No. 2. Omnigraph.



An elongated drive belt connected the drive shaft of the electric motor to the rotating platter. A total of 60 discs was included with this model. At \$10 in 1909, this amounted to nearly a weeks' wages for a typical worker, making the purchase of this instrument a very serious decision. A slightly different version of this instrument with a different design cam mechanism also allowed for hand cranking ([fig.21](#)).

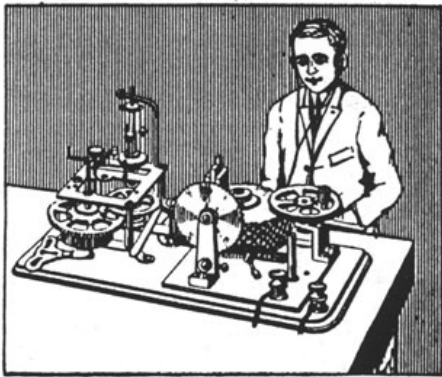
Fig. 21: Another version of the “Omnigraph No. 2 Improved” with a different type of cam mechanism and a provision for hand cranking the instrument. Notice the different style discs with large holes. The author has never seen these discs such as these and wonders if they were ever produced.



A slightly different version of the 15 disc model advertised as “New Omnigraph No. 2” in 1910 employed the wind-up motor and also had the capability of hand cranking the device if desired ([fig.22](#)).

Fig. 22: “New Omnigraph No. 2” from a 1910 advertisement. The 15-disc instrument could be powered by either the clock motor or a manual hand crank. Notice the user wearing earphones. Auxilliary equipment such as a buzzer or oscillator must have been present and not illustrated.

LEARNING TELEGRAPHY



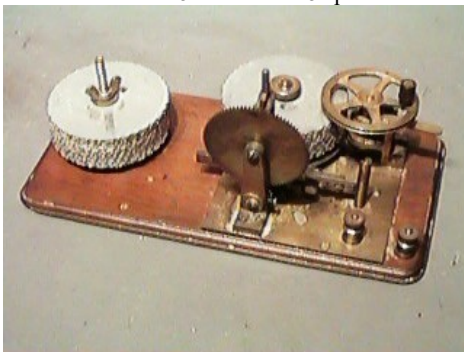
becomes simple when your instructor is the Omnigraph Automatic Transmitter. Combined with a standard key and sounder or Wireless Buzzer, it will send you telegraph messages at a slow speed, which can be increased at will to match the sending of an expert operator as you become more proficient. Adopted by U.S. Gov't. Made in 4 styles, from \$2.50 up, all accurate. Circular free.

Omnigraph Mfg. Co., 39 L Cortlandt St., New York

As with the single disc device that has both motorized or manual drive (figs. [10,11](#)), the author wonders why the hand crank mechanism is included with motorized capability. It is possible that the company knew that the clock motors wound down very rapidly and that students working in pairs probably represented a more efficient way to use the instrument. In addition, a human could probably crank the machine more forcefully, minimizing the slowing that occurred when the cam mechanism moved the stylus from one disc to the next higher disc.

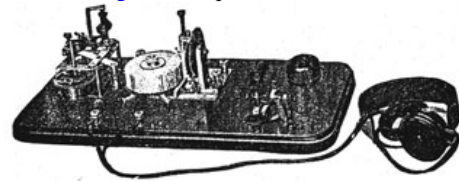
A version of the 15 disc model exists that has the hand-crank mechanism, and no motor drive, with extra stacked discs where the motor would be normally located ([fig. 23](#)).

Fig. 23: Hand crank instrument with no clock drive. This unique instrument was never advertised to the best of the author's knowledge, and contained 30 Morse discs with 15 in use and 15 spares. This instrument contained the unique discs shown in ([fig. 5](#)). (Photo courtesy of Mr. Mike Feher N4FS).



The company also supplied a 15 disc device with a buzzer and straight key, to the New York Wireless Institute ([fig. 24](#)).

Fig. 24: Omnigraph #2 with integral key, buzzer and provision for earphones. from a 1920 advertisement in QST for the New York Wireless Institute. Similar to [fig. 13](#), except with 15 discs. Students enrolling at the institute received this instrument according to the widespread advertisements for the school.



Conclusion

The Omnigraph company advertised or produced at least 15 models of telegraph learning devices over an approximately 30 year span early in the 20th century (Table 1). There may be other devices or variations thereof not listed here that may come to light, and the author would appreciate hearing about the existence of any such devices from readers. It should be noted that a number of the devices described (above) are known only by their advertisements. Telegraph manufacturers in the early 20th century are known to have advertised items that are completely unknown today, and it is uncertain if they were ever produced ([8](#)).

Devices similar to the Omnigraphs that appeared after the demise of company had an incised wheel which would send "SOS" repeatedly and were presumably of WW-II military origin.

Interestingly, in 1963, long after the demise of the company, a device was advertised in CQ magazine identical in function to the Omnigraphs ([9](#)). It consisted of a motorized circular wheel with the Morse code characters cut into the edge. Amateur radio operators could have a custom message (such as their radio call letters) cut into the disc as an operating convenience.

Inasmuch as the telegraph keys, sounders, buzzers, binding post hardware and the clock drives included with the Omnigraph instruments seem to be items supplied to the company by others, it is uncertain exactly what portions of the instrument were made at the Omnigraph factory itself. The wooden bases, the rotating platter, and the aluminum discs may be all that the company actually produced.

The unique design of the Omnigraphs represented a continuation of the 19th century American tradition of electromechanical innovation that also produced the universe of telegraph instrumentation, fire alarm systems, stock market tickers, nationwide time service systems, and innumerable other devices.

Given the explosion of the use of telegraph following the successful demonstration by Samuel Morse in 1844, and the importance that instant communication played in the economic, social, and military fabric of the 19th and early 20th centuries, the Omnigraphs played a small but important role during the declining years of telegraph.

Morse code takes advantage of the simplest property of an electrical circuit: on or off. As such, this binary form of communication may be rightfully regarded as the earliest form of digital communication, and the necessary predecessor of digital communication as we know it today.

Notes and References:

1. An Omnigraph catalogue c. 1930 listed the company as 'Established 1900'. The first Omnigraph advertisement the author could locate was from a J.H. Bunnell catalogue from 1900.
2. No advertisements for Omnigraphs were found after 1931 suggesting this year for the demise of the company.
3. Numerous radio and electrical publications and equipment catalogues from 1900-1931 were employed as reference materials and are too numerous to mention individually
4. Friedman, Neil D. A Clockwork Omnigraph; CQ Magazine Feb. 1981 p. 7-9.
5. Martin, Fredric W (KI6YN). Personal communication.
6. Elwood, John (WW7P). Personal communication.
7. Friedman, Neil D. Omnigraph Disc Codes; Old Timer's Bulletin of the Antique Wireless Association. Vol. 35, No. 1. (Feb. 1994). p. 54
8. Reinke, Roger W. I'll Never Forget That Old Whatchamacallit; Old Timer's Bulletin of the Antique Wireless Association. Vol. 37, No. 1. (Feb. 1996). p. 39.
9. 'Parks Code Wheel'; Parks Electronics Laboratories Rt. 2 Box 35, Beaverton, OR. CQ. Vol. 19, No. 5. (May 1963). p. 79

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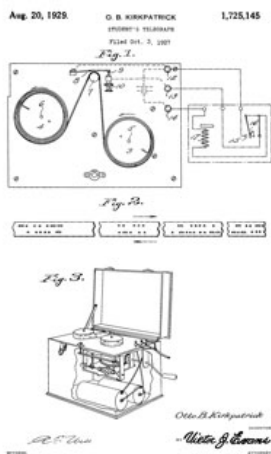
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Instructograph

The student's Telegraph ([Wiki](#)) was a training device for learning Morse Code. It worked using paper tape practice sessions. The speed at which the tape was pulled determined the Words Per Minute (WPM). There were two versions, spring wound motor and AC electric motor.



[1725145](#) Student's Telegraph, [Kirkpatrick Otto Bernard](#), 1929-08-20 - this spring wound version requires an external sounder and telegraphic key. The knob at front center regulates the governor speed and hence the WPM. Room inside for two each [No. 6](#) batteries.

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