

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN SIGNAL-CODES FOR ELECTRIC TELEGRAPHS.

Specification forming part of Letters Patent No. 58,562, dated October 2, 1866.

To all whom it may concern:

Be it known that I, FRANCIS JOHN BOLTON, of 13 Bruton street, in the county of Middlesex, Great Britain, have invented certain new and useful Improvement in Modes of Transmitting Messages by the Electric or Magnetic Telegraph; and I hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to the employment of a written or printed code of signals, and to the manner of arranging or compiling and using or referring to such code when it is desired to communicate intelligence by means of the electric or magnetic telegraph.

This code has for its basis a numerical arrangement by which, first, all words and letters of the English language can be expressed by groups of figures; second, all words and letters of any other language capable of being rendered in the English characters can also be likewise expressed.

The object of this arrangement is to facilitate the speed of transmission of messages, and to prevent the liability to error in the rendering of a message.

The telegraphic symbols used to express this code are the dot and the dash, and the following arrangement is employed to signal the numbers:

1	.
2	. .
3	. . .
4
5
6	—
7	— —
8	— — —
9	— — — —
0	— — — — —

By this arrangement the necessity of mixing dots with dashes is obviated, errors arising from the use of a combination of both are avoided, and the signals are equally simple and effective, whether used with a short and long signal or right and left deflections, the latter being the most expeditious.

The code is divided into five parts, and they are as follows:

Part I provides for one hundred and ten signals, and expresses the letters of the alpha-

bet, which alphabet, though numerically symbolized, is nearly identical with the ordinary Morse alphabet, varying only in a few letters, (this alphabet, however, will be seldom if ever used,) any particular telegraphic signals and punctuation. Of these one hundred and ten signals, ten are expressed by one figure, the remaining one hundred by two figures.

Part II provides for one thousand signals, limited to three figures, and forms the "spelling code," by which any word in any language having English characters can be spelt by syllables.

Part III provides for ten thousand signals, limited to four figures, and forms a special code applicable to commercial and political intelligence, and frequently-recurring names of places, months of the year, days of the month and week, time, hours, and dates; and as these signals are sure to be of frequent occurrence, they are denoted by short groups of figures, (limited to four places.)

Part IV provides for one hundred thousand signals, limited to five figures, and expresses every word in the English language alphabetically arranged, and such sentences as are coded, and is called the "vocabulary and sentence code," the latter of which is employed to denote such sentences and series of words as are most likely to occur in telegraphic messages.

Part V provides for one hundred and twenty-seven thousand signals, limited to six figures, and expresses the name of every known place in the world, an abstract of which, including the principal places likely to be referred to in messages, is incorporated in part III.

Each part intended to be referred to is readily distinguishable by the number of figures in the group. For instance, a group of three figures must refer to part II, which provides for signals limited to three figures, or multiples of the same, and which I designate as the "spelling code," and a group of five figures to part IV, and so on.

In the formation of this method of codification a system of page and line has been established indicating by single glance at the group of figures the particular page and line in the code-book to which they refer, thus considerably facilitating the rendering of messages

from code into ordinary language. For instance, every page in the code has one hundred lines, numbered from line 00 to line 99, and the pages are also numbered consecutively. In the receipt of a group of figures the two last figures (or the units and tens, as they would appear in numeration) represent the line, while the other figure or figures represent the page. Thus, the group 11865 would signify page 118, line 65, of part IV. The group 1866 would signify page 18, line 66, of part III, and the group 866, would signify page 8, line 66, of part II.

In the event of only one figure or a group of two figures only being received, it is known to have reference to the corresponding lines in the blank page of the code, or that portion of it providing for the letters of the alphabet and particular signals classed as part I.

Whereas the rendering of a message from code into ordinary language is particularly easy, as just demonstrated, the rendering of a message from the ordinary language into code is equally easy, inasmuch as the vocabulary and sentence part (part IV) is arranged alphabetically, and therefore any word or part of a sentence is as easily found as is any word in an ordinary dictionary, and its page and line instantly ascertained. Thus the message "as soon as convenient" will be found under the word "convenient" in the code-book, which, being numerically paged and lined, may be described, for illustration, as at page 116, line 78, or as it would appear in group 11678.

By the following explanation of the component parts of the code, it will be observed that the means have been furnished to express, by part I, the letters of the alphabet, particular telegraphic signals, and the like; part II, a ready means of spelling any word in any language having English characters; part III, sentences pertaining to commercial and political intelligence, and the names of the principal places in the world; part IV, every word in the English language, together with several thousand sentences likely to form the subject of telegraphic messages; part V, the name of every known place in the world, an abstract of which is in part IV.

To denote the names of vessels and ships-of-war, recourse has been had to the mercantile navy lists of different nations published by authority, using such a prefix as will insure reference thereto, while addresses and directions of firms and individuals in telegraphic communication will be taken by reference to the European, London, and New York directories, denoted by their respective prefixes. When necessary to express figures or numerals a numeral prefix is used.

The advantages of this system of coding by figures are the following: first, gain of speed; second, extreme simplicity of code; third, simplicity of instrumentation; fourth, non-liability to mutilation in passing through different countries, as is now of so frequent occurrence

on the line to India, and generally abroad; fifth, facility of repetition; sixth, applicability to any language by translation without causing loss of time by transmission.

This system is applicable to all long telegraphic lines, but especially to submarine lines, and by its adoption the working power of transmission over the ordinary system is considerably increased, and the like advantage will be maintained over any instrumentation which now exists or may at any time hereafter be invented.

Blank spaces may be left at intervals in the numbers of the code, which may be filled up from time to time by inserting such other sentences as may be found convenient and useful.

Annual or quarterly lists of additions or alterations in the code should be published, and a certain date fixed upon which the code is to commence working in accordance therewith.

Although the gain in time from the aggregation of words in sentences is, as the code stands, very considerable, yet this gain is by no means the measure of what will hereafter be obtained. Merchants becoming habituated to the constant transmission of necessarily similar messages by the cable will gradually fall into the use of many fixed combinations of words not now in the code. These constantly-recurring sentences may be introduced from time to time into the blank spaces of the code; and then it will be found that whereas a merchant's message at the outset requires ten or twelve groups of figures in transmission, after a few months' working it may be transmitted in four or five; and government messages will in the same manner fall into fixed formula of expression, rendering their entry in the code simple and convenient, thus adding immensely to the speed of transmission.

It is evident from what has been said that although I have here described, by way of example, a method of constructing and using or referring to a code which is based upon numbers, yet a system essentially the same in principle could be framed and employed having letters or a combination of letters and numbers for its basis. Thus, for example, in such cases where letters are employed, the pages of the book containing the codes might be designated alphabetically, or by a series of letters alphabetically or otherwise arranged; and the last two letters of a group indicated by telegraphic means may refer to the line, while the other letter or letters refer to the page where the message or part thereof intended to be transmitted will be found. Where only one or two letters are indicated by the telegraphic instrument, a certain special page of the code will be understood to be referred to, and the letters will point out the line on that particular page where the meaning of the signal is expressed. In such cases where combination of figures and letters are employed, the letters may refer to the page and the figures to the line, or vice versa; or such combination may

be constructed as may be found convenient to facilitate the carrying out of my improved system of code-signaling.

Some of the advantages of the system consist of gain in speed, extreme simplicity, non-liability to mutilation or mistakes in transmitting messages through different countries, facility of repetition, and its applicability to any language, because each nation may have the words or sentences in its own language, while the system of numbering such words or sentences will or may be the same for all.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The herein-described code of signals for communicating intelligence or transmitting messages by the electric or magnetic telegraph, and the method of arranging and compiling the same, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

F. J. BOLTON.

Witnesses:

J. HENRY JOHNSON,
JOHN J. VIDLER.