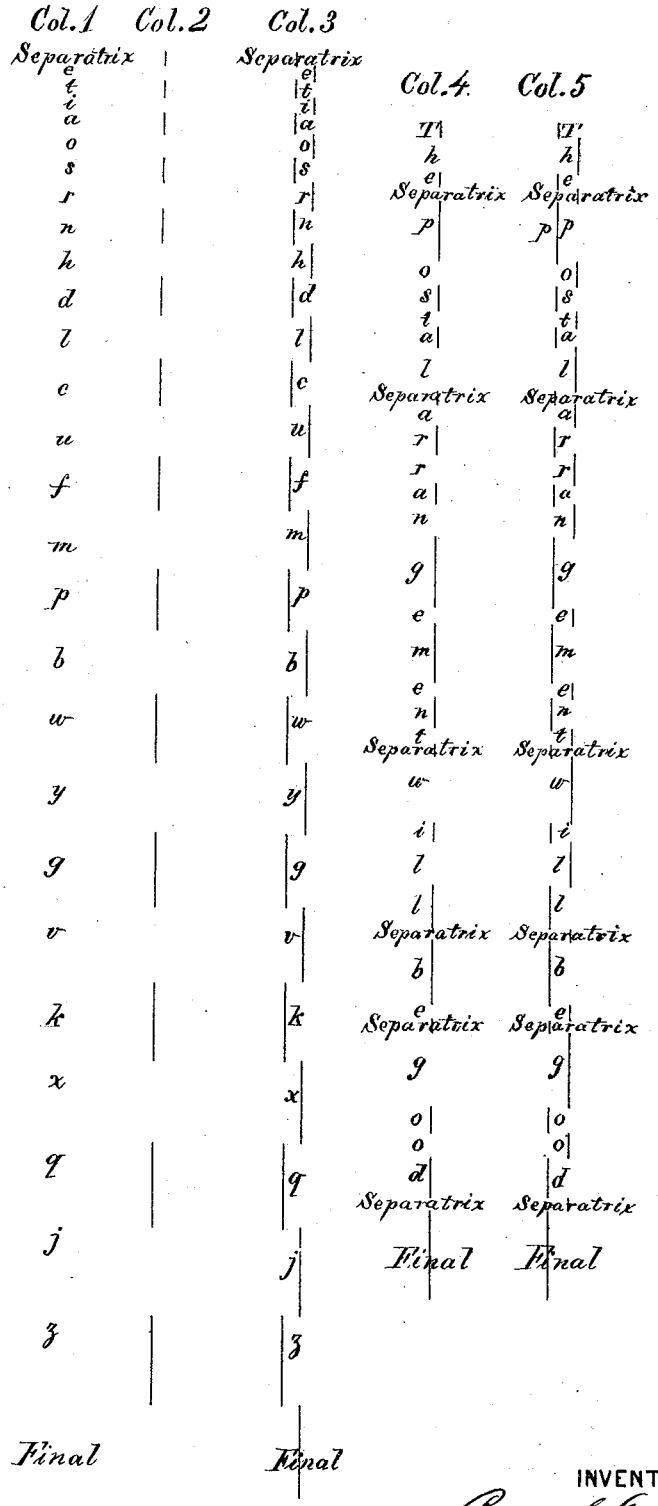
R. E. HOUSE.

TELEGRAPHIC CODE OR ALPHABET.

No. 180,096. Patented July 25, 1876.



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UNITED STATES PATENT OFFICE.

ROYAL E. HOUSE, OF BINGHAMTON, NEW YORK.

IMPROVEMENT IN TELEGRAPHIC CODES OR ALPHABETS.

Specification forming part of Letters Patent No. **180,096**, dated July 25, 1876; application filed July 1, 1876.

To all whom it may concern:

Be it known that I, ROYAL E. HOUSE, of Binghamton, in the county of Broome and State of New York, have invented an Improved Telegraph Code or Alphabet; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Column No. 1 indicates the "separatrix" that divides one word from another, the letters of the alphabet, and the "final," that denotes the end of the dispatch, arranged from top to bottom in the order of the frequency of their recurrence in ordinary telegraphic dispatches. Column No. 2 represents the whole alphabet with the separatrix and final arranged as they would be produced by a receiving-instrument having a single marking-style. Column No. 3 represents the same arranged as they would be produced by a receiving-instrument, two having marking-styles operating alternately. Column No. 4 represents a message received upon an instrument having a single marking-style, and Column No. 5 represents the same message received upon an instrument having two marking-styles operating alternately.

The present application is a division of a former application filed by me in the Patent Office June 17, 1870.

This invention is a part of a general system of electric telegraphing, which I have invented for the purpose of working telegraph lines and routes more rapidly, efficiently, and economically than heretofore. In such a system a suitable code or alphabet is of prime importance.

In all the electric-telegraph systems heretofore in use, it has been always necessary that an interval should occur between the ending of one letter or message-symbol, and the beginning of the next succeeding letter or message-symbol, in order that the two could be distinguished from each other at the receiving-station. The making of such intervals between every two letters of all the words of a message consumes and wastes a great amount of time and mechanical force, which, in a perfect system, ought to be completely utilized.

My first object is, therefore, to perfect the art of telegraphing in this respect by the use of an improved system of mechanism and the adoption of a code or alphabet of signals or message-symbols adapted thereto, of such a nature that, in practical operation, there shall be no waste of time or power between the ending of one letter-symbol and the beginning of the next succeeding one. In connection with the attainment of this object I have had still another in view, namely, to utilize for the formation of a perfect letter-symbol at the receiving-station every closing or opening of the circuit, and every change of "direction" or "potentiality" of the electric current, so as absolutely to reduce to a minimum the mechanical movements and the electric or galvanic power necessary to produce the message at the receiving-station.

My present invention consists in the improved code or alphabet of letter-symbols adapted, in connection with proper sending and receiving mechanism, to accomplish the important results above referred to.

The main principle of my improved code or alphabet, as such, consists in indicating each letter, punctuation-symbol, figure, or other elementary symbol, by the linear distance between the beginning of one message-symbol and the beginning of the next succeeding message symbol, or, which is substantially the same thing, the distance between the end of one message-symbol and the end of the next preceding message-symbol; or, as the equivalent thereof, by the time elapsing between the beginning or ending of one message-symbol and the beginning or ending respectively of the proximate message-symbol.

This principle, upon which my code or alphabet is constructed, may be carried into practice in a variety of modes, which are practical equivalents of each other. To enable those skilled in the art of telegraphy to understand thoroughly these different modes and their respective peculiarities and practical advantages and adaptations, it may be advisable, first, to state briefly the general nature of the mechanism in connection with which I propose to employ such code, which mechanism consists briefly in the following elements, viz: at the receiving-station a marking-instrument, and a fillet of paper to be marked therewith, said

llet adapted to travel continuously at a uniorm and predetermined speed past the marker; and at the sending-station mechanism so onstructed and operating, in connection with ie receiving mechanism, that the sending-perator can, by closing or opening the circuit, or reversing the current, cause the marker t will to make a line or lines of marks, or iarks and spaces, on the moving fillet, each iark, and each space between the ends of two iarks, being caused by the closed circuit or he opened circuit, or the reversed current, ıd every change from a closed to an open ircuit, or from a current of one direction or otentiality to a current of the opposite direcion or potentiality, causing at the receiving-tation a change from one mark to another, or rom a blank space to a mark, or vice versa, ccording to the adjustment and adaptation f the mechanism of the line. The absolute ength of each letter-symbol produced on the eceiving-instrument is therefore determined onjointly by the speed of the fillet and the ime that elapses between the opening and losing of the circuit, or the reversing of the urrents at the sending-instrument.

In arranging my improved code or system of letter-symbols, to be used in connection with such mechanism, I provide that the length of the several marks or spaces, indicating letters, &c., shall be inversely proportionate to the frequency with which such letter, &c., ordinarily occur in telegraphic dispatches, in order that the messages may be sent and received with the least possible expenditure of time and mechanical force. I find, by a series of careful experiments, that the frequency with which such letters, &c., occur in dispatches is directly in the following order, viz: separatrix *e t i a o s r n h d l c u f m p b w y g v k x q j z* final, as set forth in column No. 1 of the accompanying drawings. I accordingly use the shortest mark or space to indicate the separatrix; the longest mark or space to indicate the final, and the marks or spaces of the series increasing in regular order from shortest to longest, to indicate respectively the letters of the above series from separatrix to final, in the order above set forth. Any other order of arrangement may be adopted in lieu of this, if satifactory reasons appear for making the change; but, for the purposes of this specification, I shall assume the arrangement as here indicated.

Each mark, or space between two marks, represents an entire letter or other similar character, and is formed by one uninterrupted movement of the combined mechanism, which movement, for the purpose of making such symbol, is, so far as the marking-style is concerned, produced by once making or breaking the circuit or reversing the current.

When the receiving-instrument has but one marking-style the letter-symbols will consist of alternate straight marks and intervening spaces, or their equivalents, one straight mark indicating one letter, the space following the mark indicating the next succeeding letter, the mark that follows the space indicating the next succeeding letter, and so on. Thus, in telegraphing the alphabet from one station to another by such mode, the order of the lines and spaces would be as shown in column No. 2 of the drawings.

When the receiving-instrument has two marking-styles operating alternately, the letter-symbols will consist of a series of straight marks instead of marks and spaces, and column No. 3 of the drawings represents the alphabet as telegraphed from one station to another by such mode, the letter-symbols being formed in two parallel lines, one made by one style and the other by the other style, in order that each letter-symbol may be distinguished by its length from those before and after it. The difference between the two modes of forming the letters is well illustrated in columns No. 4 and No. 5, where the words "the postal arrangement will be good" appear in the former column as telegraphed by one mode, and in the latter as telegraphed by the other mode.

Instead of forming straight lines to represent the letters or alternate letters, the same result may be reached by making a dot or point, on, in, or through the fillet, to represent either the beginning or end of every letter.

It is not necessary that the letter-symbols should be of any particular absolute length or duration, nor that any particular ratio of increment from the shortest to the longest should be adopted, nor even that such ratio be uniform. It is only necessary that each should be of different length from all the others, and that the precise length determined upon for each should be understood at all the stations, and, to save time and mechanical force, as above stated, the most frequently-recurring letters should be indicated by the shortest symbols.

A careful examination of this scale or code of alphabet-symbols will show that it enables me to commence the formation of one symbol precisely at the end of the symbol which precedes it, so that absolutely no time or mechanical power is lost in passing from one letter to another. This instantaneous commencement of one letter at the end of the preceding one enables me to use every circuit-closing, circuit-opening, or current-reversing movement to form a new letter, thus reducing the number of necessary movements to an absolute minimum. The saving of time and labor is therefore effected in three directions at the same time—viz., first, by reducing to a minimum the length of the signals employed for the frequently-recurring letters; secondly, by annihilating the "lost motion" heretofore recurring between different letters; and, thirdly, by using every consecutive circuit or current movement for the entire formation of a new letter or punctuation symbol; and it will be observed that the code or scale by which these important results are attained, and by which alone they can be attained when described in

exact terms, consists not in the absolute or relative length of marks on the paper, but, as above set forth, in the linear distance between the beginning of one letter-symbol and the beginning of the next succeeding letter-symbol, or between the end of one symbol and the end of next succeeding symbol.

The marks may be of any suitable character, such as indentations, embossments, cuts, slits, colored, discolored, or burnt lines, &c., according to the form of marking-instrument which may in any case be preferred.

Sounding-instruments instead of markers and fillets may be used; but the great skill and experience necessary to their successful working will probably prevent their general adoption. In case they should be used, the symbols will be designated by the duration of time between the beginning of one and the beginning of the next. In the receiving-instrument, either the marker or the fillet may be caused to move, but practically it will be found most convenient to move the fillet.

I claim as my invention—

The code or alphabet for telegraphic use, herein described, in which each letter is designated by a symbol of arbitrary length, and is distinguished from all the other letters by the linear distance intervening, or time elapsing between its beginning and the beginning of the next succeeding symbol, or its end and the end of the next preceding symbol, each symbol being indicated by a time or space different in extent from that of any other symbol, substantially as and for the purposes above set forth.

ROYAL E. HOUSE.

Witnesses:

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L. HILL.