E. H. Hawley,

Cryptographical Alphabet,

No. 48,681, Patented July 11, 1865.

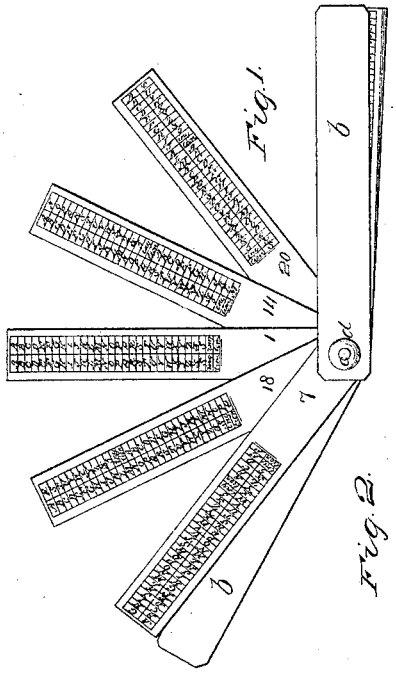

Fig. 1.

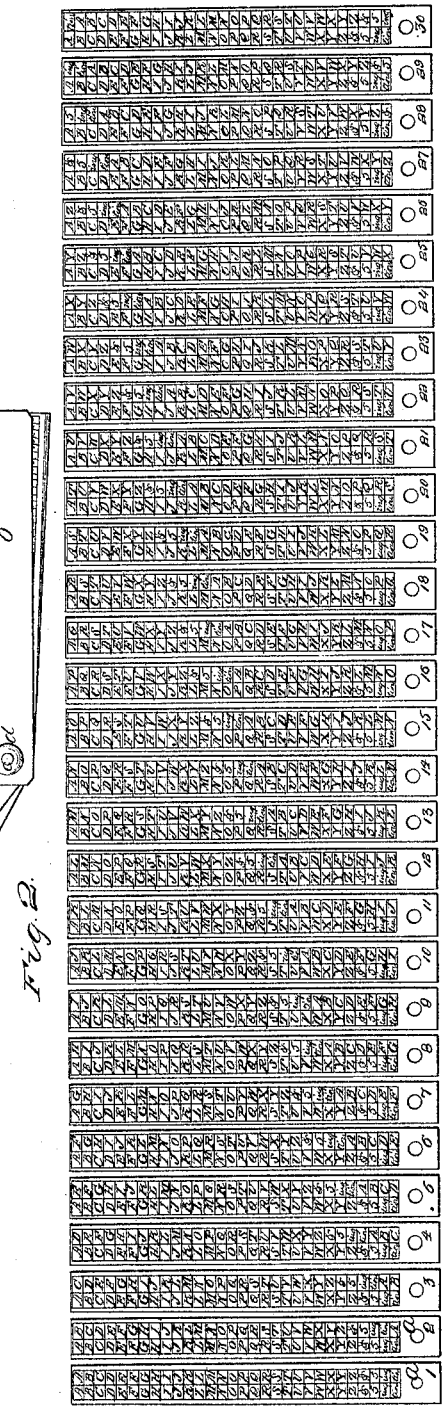

Fig. 2.

Fig. 3.

Witnesses:

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Attorneys

UNITED STATES PATENT OFFICE.

E. H. HAWLEY, OF SIGNAL CORPS, ARMY OF THE POTOMAC.

CRYPTOGRAPHIC ALPHABET.

Specification forming part of Letters Patent No. **48,681**, dated July 11, 1865.

To all whom it may concern

Be it known that I, E. H. HAWLEY, of the Signal Corps, Army of the Potomac, have invented a new and Improved Cryptographical Alphabet; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows my improved cryptographical alphabet with its tablets arranged for giving an example of its mode of operation. Fig. 2 shows the number of tablets and the arrangement of the letters thereon. Fig. 3 shows the alphabet as closed when not in use.

The object of my invention is to so construct a cryptographical alphabet that the different letter-tablets may be variously adjusted with relation to each other as dictated by a new key-word, and the signification of the different key letters or characters so changed thereby that even an expert who thoroughly understands the system and apparatus cannot decipher a dispatch without first possessing the key-word which dictates the arrangement of the tablets.

I construct my alphabet as follows: Thirty tablets are provided by taking thirty strips of brass or other suitable material and placing thereon two columns of letters, &c., the left-hand column in all of the tablets being the twenty-six letters of the English alphabet arranged in alphabetical order, and below the last letter of the alphabet the character "&," and next below a figure "5," which when used represents the end of a word, and below the figure 5 are placed the two parts of words "ing" and "tion," making the left-hand column of each tablet consist in thirty characters, and these thirty characters having the same respective arrangement on each of the thirty tablets. In the right-hand column of characters on each tablet the same characters are employed as in the left-hand column, but in their arrangement they are transposed, so that the first right-hand letter of the first tablet is "A," the next on the second tablet is "B," and the next "C," and so on through the thirty characters and the thirty right-hand columns of the thirty tablets, the first character of the right-hand column on the thirtieth tablet being "tion." In the lower or blank end of each tablet a hole, *a*, (see tablets 1, 2, and 3, Fig. 2,) is made, and they are pivoted together between a pair of guards or covers, *b b*, Fig. 1, by a pivot, *c*, the pivot being secured in place in an adjustable manner by a nut, *d*, or by other suitable means.

To illustrate, its operation is as follows: If the communicating parties have agreed upon the word "Grant" as the key-word, then the pivot *c* is withdrawn, and the tablet which has the letter "G" at the top of the right-hand column is first selected, (tablet No. 7,) and next the tablet whose right-hand column begins with "R," (tablet No. 18,) and then the other three tablets whose right-hand columns begin with "A," "N," and "T" are successively picked out. The five tablets whose right-hand columns are headed with the five letters which spell the key-word are then placed on the pivot *c* in the same order as the letters in the key-word, "GRANT," as shown by Fig. 1. The rest of the tablets are then slipped onto the pivot and turned back into the palm of the hand and serve as a handle. The pivot *c* is then secured in place by screwing on the nut *d*, and the alphabet is ready for reading a communication or for dictating one. Now, if the dispatch to be written should be "We have two days' rations," the mode of writing it would be as follows: The tablet (No. 7) which represents the first letter of the key-word is first referred to, and running down the right-hand column of characters until the first letter of the dispatch, "W," is found, the operator then takes the opposite letter in the left-hand column of characters, which is "Q," and writes down "Q" for the first letter of the dispatch, and then referring to the next tablet, (No. 18,) he follows down the right-hand column to the letter "E," and finding "R" opposite in the left-hand column, writes down "R" as the second letter of the dispatch; then taking the third tablet, (No. 1,) and finding in the right-hand column the figure "5," (which denotes the end of a word,) and, as is found in this case, the same character is found opposite, the figure "5" is then written down. The next tablet in order is referred to, (which is tablet No. 14,) and "H" is found in the right-hand column, and in the written dispatch will be represented by "Y." The next tablet (No. 20) is in like

manner then referred to, and "L" is written down to represent "A." The operator then begins again with the first tablet, (No. 7,) and finds a representative for the next letter of the dispatch, and so on continues to use the five tablets in regular rotation until the dispatch is written, when the written dispatch, "We have two days' rations," will appear thus: "QR5YLPR5GDIKDRFMKRRAC5NF;" and when the receiver reads the same, by using the key-word "GRANT," by which it was dictated, it will appear thus: "QR5YLPR5GDIKDRFMKRRAC5NF"—"We have two days' rations." When a key-word is to be used in which one or more than one of the letters are repeated—for instance, if the key-word "MEADE" were used—in that case the letter "E" would be repeated, and there is but one tablet (No. 5) which has the letter E at the head of the right-hand column, and the key-word "MEADE" would demand two. Provision is made for this emergency by having extra tablets of those that are most frequently used—such as begin with E, A, O, I, &c.—printed upon the backs of those tablets that are little used—such as Q, V, Z, &c.—and by turning them they may be used as duplicates of the letters most frequently used, and thereby admit of using key-words in which one or more letters are repeated; but I do not confine myself to a given number of tablets, as more that thirty may be used, if desirable.

It will be seen that in a written dispatch there are no gaps or pauses between words, and also that one and the same character in this mode may point out several different letters, or that different characters at different points of the dispatch point out the same letter—for instance, in the dispatch given the letter "R" represents "E" in the word "WE," "R" represents "A" in the word "DAYS," and "R" represents the letter "A" in the word "RATIONS"—so that even in a single dispatch no letter of the dispatch is represented by any fixed character. It so happens in the dispatch given that the first two pauses, or the ends of words, are indicated by the true character, 5; but it will be seen that a little farther on the pauses are denoted by the letter "K," and still farther on that the character "5" is employed to represent the letter "O" in the word "RATIONS," thus avoiding any fixed ground for unauthorized deciphering in those directions, and throwing such decipherer back upon the chance of hitting upon the key-word at random, which would be only one chance in millions, as many millions of key-words may be used by using sentences after the vocabulary of words has been exhausted, making a labyrinth hopelessly intricate for the unadvised or unauthorized decipherer; but, at the same time, with the possession of the key-word the process of deciphering a dispatch is simple and rapid.

I claim as new and desire to secure by Letters Patent—

A cryptographical alphabet arranged substantially in the manner and for the purpose specified.

EDWIN H. HAWLEY.

Witnesses:
M. M. LIVINGSTON,
F. A. MOSLEY.