

I. JOSEPH & E. ABERLE.

Cryptography.

No. 156,851,

Patented Nov. 17, 1874.

Fig. 1.

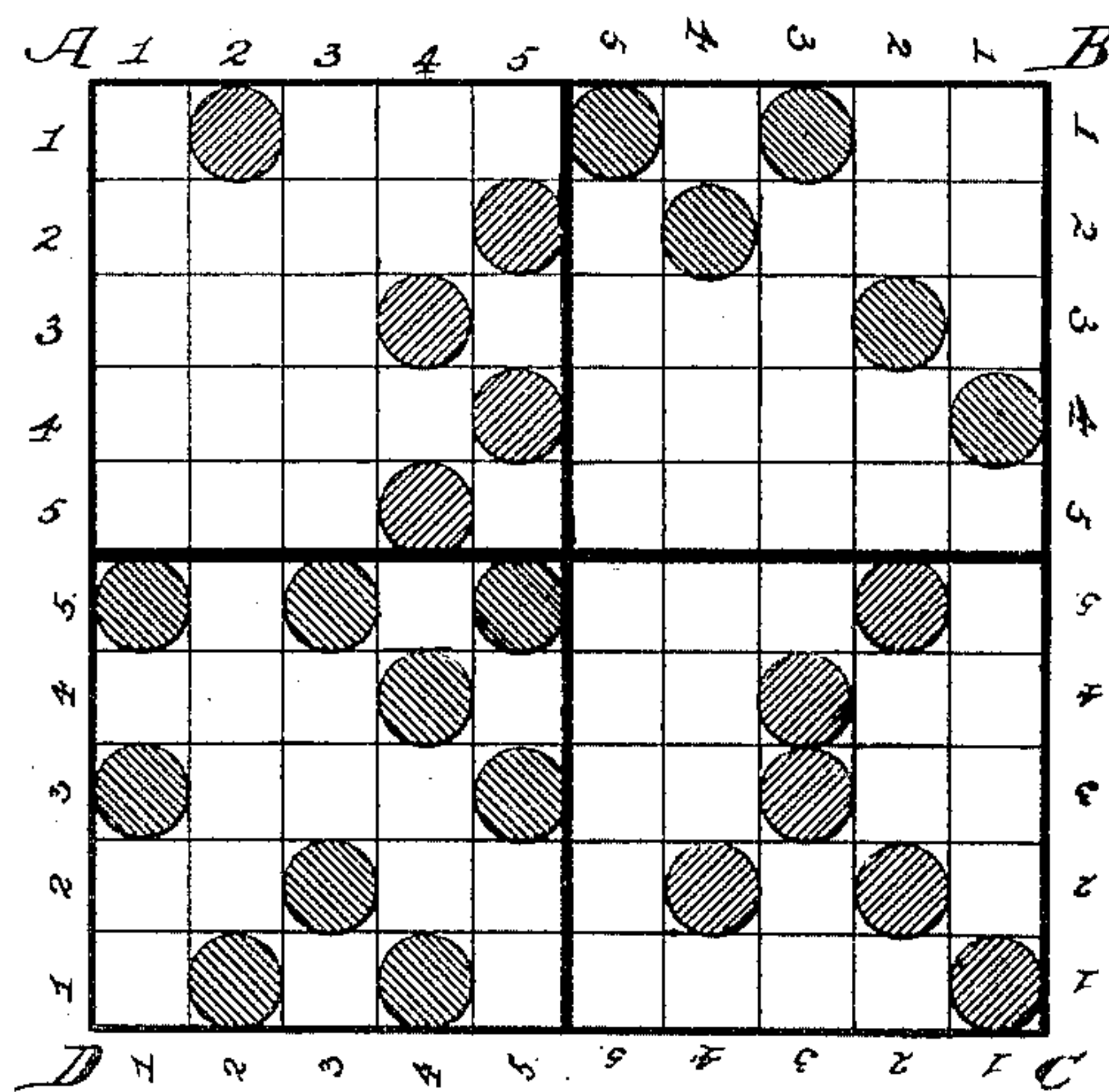


Fig. 2.

	A	B	C	D
1	2	4	1	3.5
2	5	3	2.5	1
3	4	1	3	2.5
4	5	2	3	1.5
5	4	1	2	3.5

Witnesses.
W. P. Warner.
H. Hallowell.

Inventors.
Isaac Joseph.
Emil Aberle.

UNITED STATES PATENT OFFICE.

ISAAC JOSEPH AND EMIL ABERLE, OF ST. PAUL, MINNESOTA.

IMPROVEMENT IN CRYPTOGRAPHY.

Specification forming part of Letters Patent No. 156,851, dated November 17, 1874; application filed July 24, 1874.

To all whom it may concern:

Be it known that we, ISAAC JOSEPH and EMIL ABERLE, both of the city of St. Paul, in the county of Ramsey and State of Minnesota, have invented a Perforated Card, by the use of which matter may be written, printed, and telegraphed in such manner that the same cannot be read or understood without the aid of such card or a duplicate thereof, of which the following is a specification:

Our invention embraces not only the completed card, but the method of preparing the same for the application thereof to cryptography, secret writing, printing, and telegraphing.

The method of preparing such card is as follows, viz: It may be made from thin paper card-board, or out of metal or other suitable material. Upon the material we draw a square and subdivide the same into four equal squares, and for convenience, and to avoid confusion and error in the subsequent proceedings, distinguish these quarter-sections by symbols, as in Figure 1, hereto attached. We then subdivide each of such quarter-sections into any desired number of equal square spaces. The size of these latter spaces will determine the distance between the lines of writing. Then number the tiers of these spaces in each quarter-section consecutively each way from the corners of the square first drawn, as in said Fig. 1. We then prepare four columns, one to correspond with each of said quarter-sections, and distinguish them, respectively, by the same symbols used in distinguishing the quarter-sections. Then subdivide such columns by horizontal lines into as many tiers of spaces as there are figures at the side of one of such quarter-sections, and number such tiers on the margin from top to bottom, and we have a table in blank, as represented by Fig. 2. Then, at random, fill into the upper or first tier of the spaces in this table the figures found at the side of such table, (being the same found at the side of such quarter-section,) taking care, however, to use the same figure only once in the same horizontal tier of spaces in the table; but if the figures exceed four in number, then two or more will be placed in the same space of the table. Then place the diagram first made, so that one of the quarter-sections

(for example, the one distinguished in Fig. 1 as A) will be at the upper left-hand corner, when it will be noticed that the horizontal tiers of spaces therein are numbered from top to bottom of such quarter-section consecutively, 1, 2, 3, 4, and 5, and that the perpendicular tiers of spaces in such quarter-section are numbered consecutively from left to right in like manner. It is obvious that if the quarter-sections had been subdivided into a greater number of square spaces, then there would have been a corresponding increase in the number of figures at the margin thereof, as well as at the margin of such table. Now, in the first or upper horizontal tier of spaces in such quarter-section A, dot or otherwise mark the space or spaces directly beneath the figure or figures found in the upper or first space of the column marked A in the table, and then in like manner dot or otherwise mark the spaces in each subsequent horizontal tier of such quarter-section, according to the figures found in the corresponding space of column A of the table. Then revolve the card on its center one-quarter, and proceed to dot or otherwise mark the spaces of the next quarter-section in like manner, according to the figures found in the corresponding column of the table, and so proceed with each of the quarter-sections. Then, with a circular cutter or die corresponding in diameter with the size of such spaces, cut out holes in all the spaces so dotted or marked, and the card will be ready for use.

For convenience in use, this card should be provided with a sharp point at its center, upon which it may revolve; but the same result may be attained by guide-points on the margin, or by drawing a line around it upon the paper to be written upon before the writing begins. It is essential in use that this card be revolved accurately upon its center.

In using this card the operator will place the same upon the paper to be written upon, and then proceed to write whatever is desired upon such paper through the openings, placing words or parts of words or letters in the openings. When all the openings thus presented are filled, revolve the card on its center one-quarter, and it will be found that the same holes expose portions of the paper beneath

free of writing, and proceed with the writing, as before. Then revolve the card again one-quarter on its center, and proceed with the writing, and so on until the card has been so revolved quarterly three times.

If the operator desires to continue writing, the card must be placed upon a fresh place, when he will proceed as before. If the matter to be written will not take up all the openings during the three quarterly turns, nevertheless the three quarterly revolutions should be made, and the surplus openings should be filled with characters at random, in order to complete the lines and promote obscurity.

When the card is removed continuous horizontal lines of characters will be found, which cannot be read or deciphered without the aid of such card or a duplicate thereof; hence each correspondent must be provided with such duplicate, and it may be made at the same time with the original and at one operation.

By placing such card or its duplicate in the same position that it occupied when the writing began, and then reading and revolving it quarterly, as was done while writing, these characters can be read and understood.

This card may be used in communicating by telegraph by placing a given number of letters in each opening, and having the result telegraphed as letters and not as words. If the letters of the dispatch be by the correspondent filled into a card similar in size and spacing to the one used in preparing his card, then the result may be read as in other cases.

These cards are particularly well adapted to correspondence carried on by postal-cards and for the military and detective service. They should be manufactured in sets of two or more

in each set; but no two sets should be made alike.

It is obvious that by varying the size of the card or the spacing an infinite variation may be attained.

The number of perforations in any card will always be equal to the number of spaces in one of the quarter-sections, and, owing to the fact that the same figure is not used more than once in any one horizontal tier of spaces in the table, therefore no opening of the card ever will or can expose the same portion of any one horizontal line more than once. Yet, by revolving the card quarterly at a time, every portion of each horizontal line will be exposed at least once, and so of each perpendicular line; hence the writer may write horizontally or perpendicularly, at pleasure, and the result may be read with equal facility, provided the correspondent be apprised of the course pursued.

We claim as our invention—

An improvement in cryptography or secret writing, consisting essentially of a card perforated, prepared, and arranged to operate substantially as described, so that, until it is completely revolved quarterly at a time upon its center, the openings therein will never expose the same portions of any horizontal or perpendicular line made in relation thereto more than once, and yet will expose every portion of such lines once during each complete revolution thereof.

ISAAC JOSEPH.

EMIL ABERLE.

Attest:

W. P. WARNER,
HENRY W. CORY.