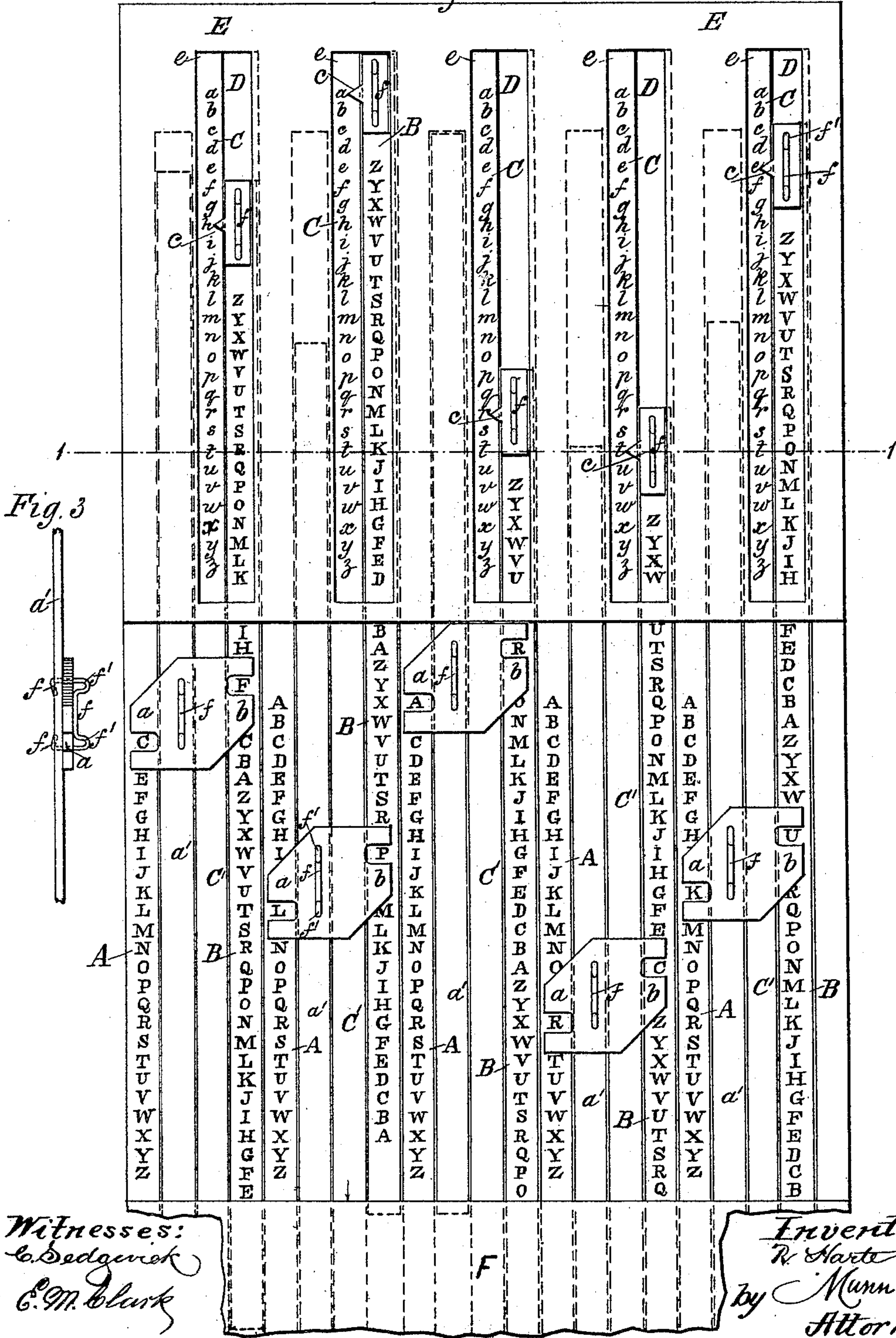
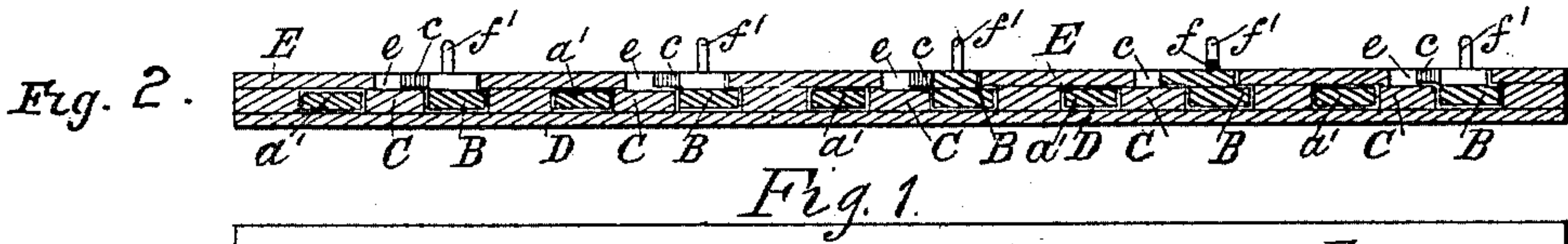


(No Model.)

R. HARTE.
CRYPTOGRAPHIC INSTRUMENT.

No. 492,677.

Patented Feb. 28, 1893.



UNITED STATES PATENT OFFICE.

RICHARD HARTE, OF CROYDON, ENGLAND.

CRYPTOGRAPHIC INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 492,677, dated February 28, 1893.

Application filed September 30, 1892. Serial No. 447,367. (No model.)

To all whom it may concern:

Be it known that I, RICHARD HARTE, journalist, of 1 Chatsworth Villas, Croydon, in the county of Surrey, England, have invented
5 new and useful Improvements in Cryptographs, of which the following is a full, clear, and exact description.

My invention relates to an improved cryptograph or instrument for translating communications into and out of cipher in accordance with any arbitrarily selected collocation of letters word or sentence of indefinite length adopted as a key. The instrument comprises two or more similar elements in
15 combination, each element consisting essentially of fixed and movable alphabetical series of letters and corresponding indexes so combined and arranged for operation with regard to each other and capable of such preliminary adjustment with regard to any selected key letter, that the key letter, the letter to be disguised or translated, and the corresponding cipher letter, may be said to be mutually reciprocal inasmuch as from any two
25 the third may be found so that the instrument may be used in precisely the same manner whether for translating a message into or out of cipher. One of the series of letters may comprise more than one complete alphabet. Each element comprises a fixed alphabetical series of letters (which may be termed the normal alphabet) and a movable index in combination with another index movable therewith as one and with a movable alphabetical series (which may be termed the cipher alphabets) and an index which is adjustable with regard to a third fixed alphabet, which may be termed the key alphabet and which bears a constant relation to the first
40 mentioned or normal alphabet, the movable cipher alphabet and the key index last mentioned being constant with regard to each other and moving together for the purpose of being set or adjusted with regard to the fixed normal and key alphabets, so as to determine the relation of the normal and cipher alphabets according to the key letter selected. The movable members of this combination are fitted to work alongside the fixed members
50 and are adjusted with reference thereto by a rectilinear sliding motion. By arranging any

number of such elements side by side, a cryptographic instrument is produced which may be conveniently used in connection with a key word or sentence of any length. 55

Reference is to be had to the accompanying drawings forming part of this specification, wherein

Figure 1 is a plan view of the instrument and Fig. 2 is a cross-section, on line 1—1 Fig. 60 1. Fig. 3 shows a detail of construction.

The same letters of reference denote like parts in all the figures.

The drawings illustrate an instrument comprising only five elements, but it will be understood the number is capable of unlimited extension according to the length of the key word or sentence to be adopted, or the same elements may be reset as often as desired to complete the key word or sentence. Each
70 element comprises a stationary strip A bearing the normal alphabet over or alongside of which works a sliding index *a* carried by a sliding strip *a'* working alongside the strip A. Adjacent to this strip *a'* is a fixed strip
75 C' and beyond this a sliding strip B bearing two complete cipher alphabets preferably arranged consecutively and in inverse order to the normal alphabet A.

b is the index of the cipher alphabet B. It
80 is made in one with the index *a* and to avoid liability of mistakes, it is preferably but not necessarily placed out of line with the index *a* and for the same reason the alphabets A B are printed in different colors. Upon the upper
85 end of the strip B is carried an index *c* which works over a fixed key alphabet C at the upper part of the instrument and is adjusted with regard thereto according to the key letter selected, and together with cipher
90 alphabet B remains stationary after being so set. Thus B and *c* move together and are constant with regard to each other while *a* and *b* are also constant with regard to each other and are adjustable with regard to A and B
95 respectively, so that the indication given by the index *b* will vary according to the adjustment of the cipher alphabet B. The slides *a'* and B are fitted to slide in grooves in the base board of the instrument and have handles by
100 which they may be easily moved.

It is preferred to construct the instrument

of cardboard by attaching the parallel fixed strips A and C' of that material to a base board D of the same or other solid material so as to leave grooves between the said strips in which the movable strips *a'* and B slide. The upper and lower portions of all the strips are covered by top plates of cardboard E, F, leaving uncovered the middle portion of the instrument at which the alphabets A B are visible and in which spaces the indexes *a, b*, work. The movable strips slide beneath these cover plates and in the upper cover plate E is a series of apertures *e* at which the key alphabets C are visible and in which the indexes *c* work. The several indexes are preferably attached to their respective strips by a wire staple *f* of the form shown in Fig. 3, provided with upwardly projecting bends or offsets *f'* which can be conveniently grasped between the finger and thumb for the purpose of shifting the sliding strips. The indexes *a b* are preferably formed with a gap disclosing the letter indicated and covering the adjacent letters, so as to avoid liability of error.

The instrument may be used as follows: Suppose the name "Harte" to be selected as the key, the several key indexes *c* of the five combinations of elements composing the instrument are set to the several letters of that key word, as shown. Suppose the word to be translated into cipher to be the name "Clark," this may be done by bringing the several indexes *a* to the several letters of that word on the normal alphabets A, as shown, whereby the indexes *b* are brought opposite the several letters "F, P, R, C, U," on the different cipher alphabets B which letters are the ciphers corresponding to the word to be transmitted. To retranslate this cipher word the recipient having set the indexes *c* of his instrument to the key-word "Harte," brings the indexes *a* to the cipher letters "F, P, R, C, U," on the normal alphabets A and reads off the message "Clark" on the cipher alphabets B at the indexes *b*.

I claim—

1. A cryptograph, or instrument for translating communications into or out of cipher, consisting essentially of the combination of a fixed normal alphabet strip, a movable cipher alphabet strip parallel with and moving in proximity to the normal alphabet and provided with an index, a double movable index working over both of said alphabets, and another fixed or key alphabet parallel to but not alongside of the normal and cipher alphabets, and with regard to which key alphabet and to the normal alphabet the movable cipher alphabet is adjustable by means of the index carried by said movable alphabet strip, substantially as specified.

2. A cryptograph, or instrument for translating communications into or out of cipher, consisting essentially of the combination of a fixed normal alphabet strip, a movable cipher alphabet strip parallel therewith and working in proximity thereto and provided with an index, a double movable index working over both of said alphabets, and another fixed or key alphabet parallel to but not alongside of the normal and cipher alphabets, to which key alphabet and to the normal alphabet the cipher alphabet is adjustable by means of the index carried by the movable cipher alphabet strip, substantially as specified, the key index and key alphabet being visible at an aperture in the instrument frame removed from the normal and cipher alphabets directly used in translating, so as to avoid confusion therewith, as described.

3. A cryptograph constructed of a combination of two or more elements, each element consisting of the combination of a fixed normal alphabet strip, a movable cipher alphabet strip parallel therewith and working in proximity thereto and provided with an index, a double movable index working over both of said alphabets, and another fixed key alphabet parallel to but not alongside of the normal cipher alphabets to which key alphabet and to the normal alphabet the movable cipher alphabet is adjustable by means of the index carried by the movable cipher alphabet strip, substantially as specified.

4. The herein described instrument constructed of parallel strips fixed to a base plate, intermediate sliding strips working in grooves alternating with the fixed strips, normal and key alphabets carried on the fixed strips, a double index on each alternate sliding strip, a double cipher alphabet on the remaining sliding strips, and an index on each of said cipher alphabet strips as specified.

5. The herein described instrument constructed of parallel strips fixed to a base plate intermediate sliding strips working in grooves alternating with the fixed strips normal and key alphabets carried on the fixed strips, a double index on each alternate sliding strip having gaps at opposite sides out of alignment with each other, a double cipher alphabet on the remaining sliding strips, and an index on each of said cipher alphabet strips as specified.

Dated this 26th day of August, 1892.

RICHARD HARTE.

Witnesses:

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