

## IN THE UNITED STATES PATENT OFFICE

In re application of  
W.F. Friedman,  
Serial No. 157,363,  
Filed Aug. 4, 1937,  
Cryptographic Apparatus

Div. 55, Room 6897

May 25, 1938.

Hon. Commissioner of Patents,

Sir:

Responsive to Patent Office Action dated Dec. 3, 1937,  
it is desired to amend as follows:

In the specification, page 3, delete the matter comprising the paragraph beginning with line 10 through to the end of the page and also delete the first seven lines of page 4. For the cancelled matter substitute the following :

- - According to the present invention, means are provided whereby the individual alphabets of a set of twenty-six or more mixed cipher alphabets are caused to present themselves for ciphering purposes in a fixed sequence and this sequence is regularly repeated. When a key on the keyboard is depressed only one of these cipher alphabets, however, is selected during one complete presentation of the sequence of alphabets and the cipher resultant obtained depends upon the cipher alphabet that has been selected. This selection is varied according to a very long cipher key.

Broadly speaking, the foregoing cryptographic operation is accomplished in practicing the invention in the following manner: -

The rotor 3 serves as switching means for changing the whole set of twenty-six connections between the keyboard 1 and the bank of indicating devices 2. The rotor is caused to rotate with a constant angular velocity by the motor 93, and the time required for the rotor to make one complete revolution will hereinafter be referred to as the operating cycle. Assuming a system employing twenty-six elements ( to correspond with the twenty-six letters of the English alphabet ) rotor 3, in making a complete revolution will pass through twenty-six angular positions, each consuming  $1/26$ th of the time required for the rotor to complete one operating cycle. The operating cycle may therefore be regarded as being subdivided into twenty-six equal time-intervals during which a letter may be enciphered by the cryptograph. To each of these time-intervals or angular positions of the rotor, there corresponds a cipher alphabet, that is, a set of connections between the keyboard and the bank of indicating devices. Coordinated with the rotor is the distributor 4, whose brush arm 16 causes brush 75 to sweep over the twenty-six equal segments of the face of the distributor synchronously with the rotation of the rotor. The distributor cooperates with the keying mechanism to determine which of the cipher alphabets will be selected, that is, which of the twenty-six angular positions of the rotor, or which of the twenty-six time-intervals, will be the one selected during a specific operating cycle for enciphering ( or deciphering ) a letter. This selection in each case varies with the successive operating cycles according to a cipher key which is produced by the cam-wheel cipher-key mechanism 5. Each different one of the twenty-six time-intervals will yield a different resultant for the same letter ; therefore there are

twenty-six different resultants possible for each letter. Within the operating cycle, when a key of the keyboard is depressed, the letter corresponding to this key is enciphered ( or deciphered ) by that one of the cipher alphabets which was selected in the aforesaid manner. Arrangements are made for locking up the keyboard so that when a key is depressed not only will the associated keyboard contact be closed but also it will remain closed for one whole operating cycle and no other key can be depressed during that same cycle. Thus, keyboard operation may be regarded as being rhythmic in character and may be performed with a cadence similar to that in teletype operation. The operation of the keyboard results in the action of the responsive indicating devices 2, which may print the characters produced by the ciphering operation in a rhythmic manner. But it is obvious that this cadence does not have to be reproduced identically by the operator who is to decipher messages for the cadence is not at all an essential part of the functioning of the apparatus. In fact, if a clutch mechanism were provided whereby the rotor and the distributor would only be started consequent upon the depression of any key of the keyboard, and would be stopped automatically at the end of the operating cycle, then for each depression of the key the rotor and the distributor brush arm would start, would make one complete revolution, the letter would be enciphered ( or deciphered ) and upon completion of the revolution both the rotor and the distributor brush arm would stop. Thus, no cadence in keyboard operation would be required, and operating speed would only be limited by practical considerations. The foregoing apparatus and its operation will now be described in detail. - -

Page 7, line 7, correct "banch " to read - - bench - -

Page 10, line 2, change " so " to read - - to - - same page,  
last line, correct the spelling of "constact " to read - - contact - -

Page 15, line 2, " march " is changed to - - mark - - same  
page, line 3 from the bottom before the word "contact" at the end of  
the page, cancel " a " and substitute - - one - -

Page 16, line 2, cancel " 84 " and substitute - - 85 - - ;  
Line 3, cancel " 115 " and substitute - - 116 - - Line 4, cancel  
" 85 " and substitute - - 84 - - ; Line 10, cancel " 85 " and sub-  
stitute - - 84 - - ; Line 11, cancel "84 " and substitute - - 85 - -

Incorporate the following additional claim :

19. A cryptograph constructed, arranged and adapted to operate  
substantially in the manner and for the purpose herein described and  
illustrated by the accompanying drawings.

#### REMARKS

The Examiner's queries as to the meaning of the expressions  
" time " , "time-intervals " , and also as to the significance of  
the expression "cadence" have been noted and the matter inserted on  
pages 3 and 4 of the specification will, it is believed, clarify the  
meaning and will otherwise give a better understanding of the operation.  
Care has been taken to confine the inserted matter strictly to the dis-  
closure and to avoid new matter.

All formal corrections in the specification have been made and the confusion in reference numerals on page 16 has likewise been rectified.

With respect to the claims, it is noted that the grounds of rejection go to clearness of disclosure in respect to the question of cyclic performance. The amplified matter directed to be inserted in the specification on pages 3 and 4 is intended to overcome this ground of objection.

As regards the references cited, it is understood that these patents are not cited as anticipating the claims originally presented. In the first place, the patent to Crede is in a remote class and does not appear to be pertinent. As to the other patents, and particularly referring to the last two, viz: Koch and Hebern, it is sufficient to call attention to the fact that the apparatus in each instance is periodic or meter like in its operation. None of these patents appears to conflict and the claims originally presented appear to fully distinguish from the known art.

Further action is courteously solicited in the light of the foregoing.

Respectfully submitted,

W.F. Friedman,  
By:

Attorneys