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CIPHER CODE.

APPLICATION FILED SEPT. 10, 1909.

983,482.

Patented Feb. 7, 1911.

2 SHEETS—SHEET 1.

Fig. 1

KEY SYSTEM.

a - 1

b - 2

c - 3

d - 4

e - 5

f - 6

g - 7

h - 8

i - 9

j - 0

k - to be used before all KEY words below 10000

l - " " " " " " " from 10001 to 19,999 inc.

m - " " " " " " " from 20001 to 29,999 inc.

n - " " " " " " " from 30001 to 39,999 inc.

o - " " " " " " " from 40001 to 49,999 inc.

p - " " " " " " " from 50001 to 59,999 inc.

q - " " " " " " " from 60001 to 69,999 inc.

r - " " " " " " " from 70001 to 79,999 inc.

s - " " " " " " " from 80001 to 89,999 inc.

t - " " " " " " " from 90001 to 99,999 inc.

u - " " " " " " " from 100001 to 109,999 inc.

v - " " " " " " " from 110001 to 119,999 inc.

w - " " " " " " " from 120001 to 129,999 inc.

x - " " " " " " " from 130001 to 139,999 inc.

y - " " " " " " " from 140001 to 149,999 inc.

z - " " " " " " " from 150001 to 159,999 inc.

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2 SHEETS—SHEET 2.

Fig. 2

klx1x - 10,000	klxtx - 90,000
kmxmx - 20,000	kuxux - 100,000
kxxnx - 30,000	kvxvx - 110,000
koxox - 40,000	kwxwx - 120,000
kpxox - 50,000	kxlxx - 130,000
kqxqx - 60,000	kyxyx - 140,000
krrrx - 70,000	kzzzx - 150,000
ksxsx - 80,000	

Fig. 3

EXAMPLE			
Key word	Code Word No.	Code Word	Translation
Ocgid	43,794	Expalpanda	Letter is too indefinite
nfeje	36,505	Encacho	When do you expect to be home?
koxox	40,000	Erpetico	Require more definite instructions
Kjegi	0,579	Belluaire	Will forward statement of account by first mail.
Kihge	9,875	Caranguer	If you have communicated with
Clarke	(no code word)		Mr. Clarke
uhijg	38,907	Enxelhavia	Inform us of any change
TOTAL	169,660		
fiffj	69,660	"Check Word"	

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UNITED STATES PATENT OFFICE.

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CIPHER-CODE.

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To all whom it may concern:

Be it known that we, WILLIAM COYNE and JOHN J. RASKOB, of Wilmington, in the county of Newcastle and in the State of Delaware, have invented a certain new and useful Improvement in Cipher-Codes, and do hereby declare that the following is a full, clear, and exact description thereof.

Our invention relates particularly to cipher codes designed to be used in sending telegraphic and cable despatches, so that despatches which are sent thereby may be shortened and kept secret.

The object of our invention is especially to provide a cipher code of this character, each part of which does not contain more than five letters, the limit allowed by the Western Union and Postal Telegraph Companies, and, in fact, to use words which contain invariably the same number of letters. We have chosen five letters as the most advantageous number of letters of which words shall consist, but a different number of letters may be used if found desirable. This simplifies and consequently renders more accurate the work of the telegraph operator, inasmuch as words of five letters are much easier to remember and transmit than words containing a larger number of letters. At the same time, although our code comprises words containing only five letters, a sufficient number of words are provided for indicating 159,000 phrases of any desired length. It will be seen that our code is thus ample in extent, inasmuch as the Western Union code contains only 158,000 code words.

A further object of our invention is to provide a check-word, by means of which it can be readily determined whether the message has been accurately sent.

A further object of our invention is to provide a code which may be used in connection with any other private code containing numbered words or numbered phrases. In the case of private codes which do not contain numbered words or phrases, it is only necessary to number the words or phrases therein, in order to adapt it to use in connection with our code.

We have shown one embodiment of our invention in the accompanying drawings, in which—

Figure 1 indicates a table of digits and prefix letters; Fig. 2 indicates a table giving

the special key-words used to indicate the tens of thousands; Fig. 3 gives a table indicating in what manner the numbers applied to any particular words or phrases can be translated into key-words in our code.

In the form of our invention shown in the accompanying drawings, the letters *a* to *j* are used to indicate the digits of the system. These are used only in the last four places of any particular number. The numbers appearing in the fifth and sixth places of a particular number are indicated by the letters *l* to *z*, which are to be called prefix letters. An additional prefix letter *k* is used to indicate that a particular number is below 10,000, and the above system applies to all numbers except the even tens of thousands, as shown in Fig. 2. In the case of these numbers special key-words are used. In order to indicate a particular number by means of a key-word in our code, the tens of thousands are first indicated by means of one of the letters *l* to *z*. Supposing the number to be 43,794, as shown in the first example given in Fig. 3, the 40,000 would be indicated by an *o*, and the remaining figures appearing in the number, *i. e.*, in the last four places, would be indicated by the letters *a* to *j*, corresponding to the particular digits.

The key-word appearing in the second example shown in Fig. 3 is obtained in a similar manner. The third key-word in said table is a word taken direct from the table of tens of thousands, appearing in Fig. 2.

Referring to the fourth example appearing in the table shown in Fig. 3, in case the number is less than 10,000 and the prefix letter *k* is applied to the front of the key-word, the last four places of the number are then indicated by the letters corresponding to the digits, in the same manner as in the case of the first and second examples appearing in this table. When the number is one of less than four places the prefix letter *k* is applied, the digits of the number are represented by the corresponding letters and the word is made one of five letters by representing each of the blank spaces between the digits and the letter *k* with the letter *j*, which represents zero. As shown in the table given in Fig. 3, the numbers used are obtained from any code containing numbered words or numbered phrases.

In case it is desired to apply our code to

use in connection with a code which does not contain numbered words or phrases, it is merely necessary to apply to the words or phrases of a code numbers in a serial order up to 159,000. If desired, a private code may be readily constructed merely by making a list of phrases and applying to said phrases numbers in a serial order.

In order to indicate whether a message has been correctly sent, we make use of a check-word. The check-word is to be added to the message at the end, and is obtained by adding together the numbers of all of the code words or phrases sent in a particular message, and the making up of a key-word from the last five digits appearing in the total, as shown in Fig. 3.

When a message is received which is unintelligible, it can be readily shown that an error has been made in the transmission by adding up the numbers corresponding to the key-words, and then translating the last five digits of this total into a check-word, and if the check-word sent in the message is not the same, an error has been made. The particular point at which an error has been made can also be determined by adding up the key-words which appear intelligible, leaving out the unintelligible words, and then subtracting this total from the total appearing in the check-word sent. The resulting number will be the number of the word or phrase which has been incorrectly sent.

In the practical operation of our code many advantages appear as before stated. The work of the telegraph operator is very much simplified and rendered much more accurate, as words of five letters are much easier to remember and transmit than words containing a greater number of letters. Absolute accuracy in the transmission can be determined by the person receiving the message by the use of the check-word in the manner described above. The receiver of the message can also determine in other ways whether the message has been correctly sent, inasmuch as every word, except the last word, should begin with some letter from *k* to *z*, and as every word should contain only five letters.

In case two or more words have been run together by the telegraph operator, they can be readily separated by beginning each of the separated words by letters between *k* and *z*. Again, the simplicity of the scheme expedites the codification of messages for transmission. This follows from the fact that words of five letters are easier to construct and write, and numbers are much easier to remember than letters. Finally, messages sent according to our code may be translated into the words or phrases indicated by them with a minimum amount of

labor and a minimum expenditure of time, owing to the fact that each word contains only five letters, and also owing to the fact that a series of words or phrases indicated by a list of numbers arranged in serial order, are much easier to handle than a series of words or phrases indicated by a list of code words usually unpronounceable.

While we have described our invention above in detail, we wish it to be understood that our invention is a broad one and capable of many changes without departing from the spirit of our invention.

We claim:—

1. A cipher code comprising sign groups adapted to refer to different numbers to be sent, each of said groups containing a single sign indicating either an arbitrary number or a number of multiples of said arbitrary number in a number to be sent, and at least one sign representing the digits of the number to be sent that are below said arbitrary number.

2. A cipher code comprising sign groups adapted to refer to different numbers to be sent, each of said groups containing a single prefix sign indicating either an arbitrary number or a number of multiples of said arbitrary number in a number to be sent, and at least one sign representing the digits of the number to be sent that are below said arbitrary number.

3. A cipher code, comprising sign groups adapted to refer to different numbers having signs to represent the digits and their places, and the groups referring to numbers below a given figure being provided with a special sign to indicate this fact.

4. A cipher code, comprising sign groups adapted to refer to different numbers having signs to represent the digits and their places, and the groups referring to numbers below a given figure being provided with a special prefix sign to indicate this fact.

5. A cipher code, comprising sign groups adapted to refer to different numbers having signs to represent the digits and their places, and the groups referring to numbers below ten thousand being provided with a special sign to indicate this fact.

6. A cipher code, comprising sign groups adapted to refer to different numbers having signs to represent the digits and their places, and the groups referring to numbers below ten thousand being provided with a special prefix sign to indicate this fact.

7. A cipher code, comprising sign groups adapted to refer to numbers, a given number of places in each number being indicated by letters representing digits, and the other places being represented by different letters.

8. A cipher code, comprising sign groups adapted to refer to numbers, a given number of places in each number being indicated by

letters *a* to *i*, representing digits, and the other places being represented by letters *k* to *z*.

5 9. A cipher code, comprising sign groups adapted to refer to different numbers, each of said groups containing a single sign indicating the number of tens of thousands in a number.

10 10. A cipher code, comprising sign groups adapted to refer to different numbers, each

of said groups containing a prefix sign indicating the number of tens of thousands in a number.

In testimony that we claim the foregoing we have hereunto set our hands.

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Witnesses:

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