REF ID:A70340

88020
dll

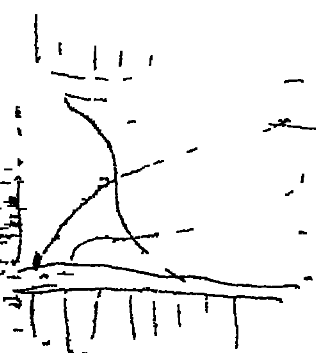
Converter M-325

SISDE-24

Reversionary Assignment made 1 Aug 44

SISDE-24 STYLUS - OPERATED CRYPTOGRAPH (CONVERTER M-325)

Aug 12
Slot in box
for access to
commutator.
spring to press on commutator
2 cells on top 1 each
5 keys in ch number
two ammeters range



POL-90
Rev

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON 25 D C

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

All communications respecting this application should give the serial number date of filing and name of the applicant

PAPER NO 20

Henry B. Stauffer
Army Security Agency
The Pentagon Bldg.
Washington 25, D.C.

Applicant	William F. Friedman
Ser No	549,086
Filed	Aug. 11, 1944
For	ELECTRICAL SYSTEM [illegible] DIVI

MAILED
FEB 5 1953
EXAMINING
DIVISION
70

Please find below a communication from the EXAMINER in charge of this application

John [illegible] Thomas F. Murphy
acting *Commissioner of Patents*

Responsive to the amendment filed May 5, 1952.

The rejection of claims 5-7 is repeated. Applicant has failed to mention these claims in his amendment.

Claim 11 is rejected as being vague and indefinite. There is no cooperative relationship recited between the authenticator and the other element of the claim.

Claim 11 is again rejected for the reasons of record. Any indicator in each of the references can be used for authentication purposes.

Claims 16 and 17 are again rejected as being unpatentable for the reasons of record. In the Hebern patent No. 1,683,072, for example the indicators are considered to be immediately adjacent the switching elements.

Claims 1, 2, 9, 10, 18, 19, 22 and 23 are allowed.

NHE:hs

Examiner

COPY

~~CONFIDENTIAL~~

IN THE UNITED STATES PATENT OFFICE

RE: Application for Patent of *
WILLIAM F. FRIEDMAN
*
Serial Number
549,086 *
Filed
11 August 1944 *
*
For
ELECTRICAL SYSTEM *

Filed - 5 May 1952

Division 23

AMENDMENT

~~SECURITY INFORMATION~~

* * * * * * * * * * *

The Honorable Commissioner of Patents
Washington 25, D. C.

Sir:

This is in response to Patent Office action of 4 May 1949 in the above-identified application for patent which is being prosecuted under the so-called three-year rule. Please amend the case as follows:

IN THE SPECIFICATION

Page 10, line 20 - Change "included" to - include - .

22 - After "2" insert - and similarly secured to the machine by screws, as 60' - .

IN THE CLAIMS

Claim 11, line 3 - Before "to" (first occurrence) insert - normally - .

4 - After "indicate" insert - only - .

Claims 12, 13, 14, and 15 - Cancel.

Claim 16, line 4 - After "indicator" insert - immediately - .

Claim 17, line 5 - After "being" insert - immediately - .

Claim 24 - Cancel.

REMARKS

The Chief Draftsman has been requested to make the necessary changes in the drawings.

The additions to the specification appear to require no comment.

Further consideration is requested of Claim 11 as amended. None of the references discloses a combination which normally provides indications of both plain and enciphered text, yet under special conditions provides an indication of an enciphered character only.

Claims 16 and 17 also have been amended, and their reconsideration is requested.

The amended claims require, in addition to their other features, that each of the indicators be immediately adjacent its switch. It could not fairly be said of Hebern, number 1,683,072, that this condition is approached unless it be argued that the "Q" key, for example, is adjacent the "Z" indicator; in that case, it is obvious that the "P" key is considerably removed from the whole top row of indicators.

The construction of the claims provides for facility and accuracy of operation in the hands of relatively inexperienced persons.

Claims 12, 13, 14, 15, and 24 have been cancelled.

Claims 1, 2, 8, 10, 18, 19, 22, and 23 have been indicated as allowable.

Continued prosecution under the three-year rule is desired.

Favorable action is requested.

Respectfully,

WILLIAM F. FRIEDMAN, Applicant

By _____
His Attorney

IN THE UNITED STATES PATENT OFFICE

RE: Application for Patent of *
WILLIAM F. FRIEDMAN
*
Serial Number
549,086 * Division 23

Filed *
11 August 1944 LETTER TO THE CHIEF DRAFTSMAN
*
For
ELECTRICAL SYSTEM *

* * * * * * * * * * *

The Honorable Commissioner of Patents
Washington 25, D. C.

Sir:

In the above-identified application for patent, please direct the Chief Draftsman to make the corrections to the drawings as indicated in red on the attached prints.

Respectfully,

WILLIAM F. FRIEDMAN, Applicant

By _____
His Attorney

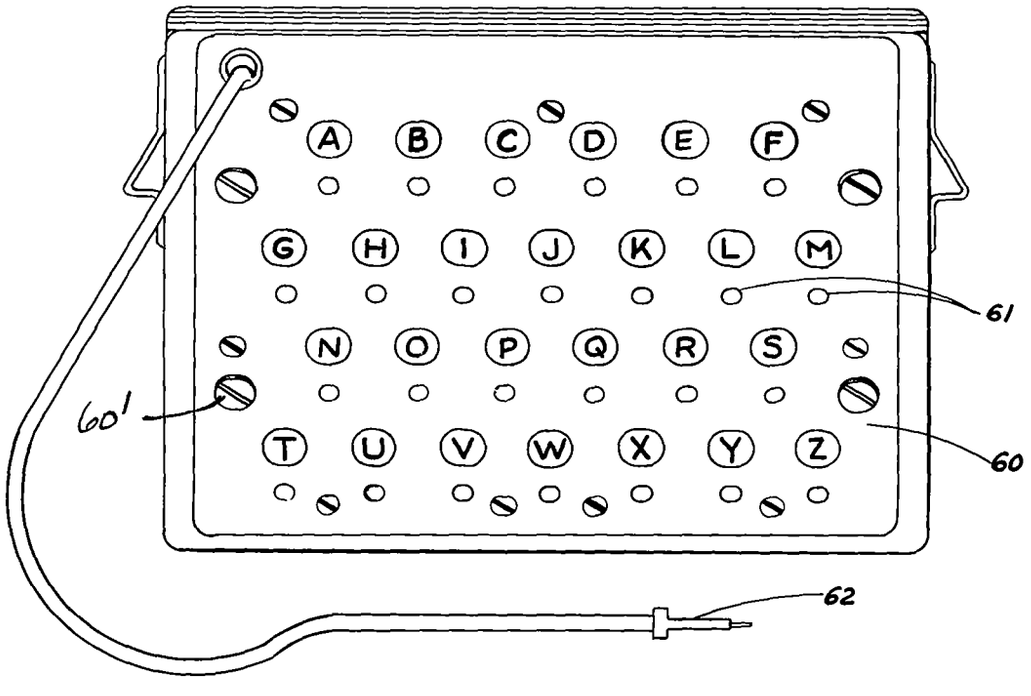


FIGURE 8

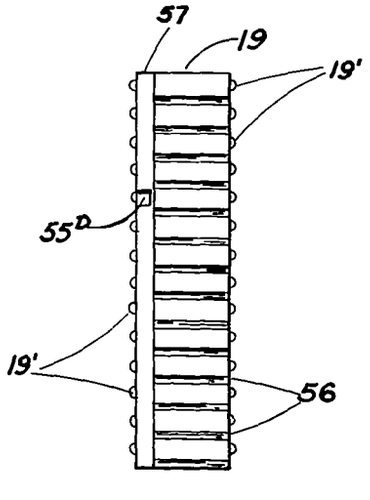
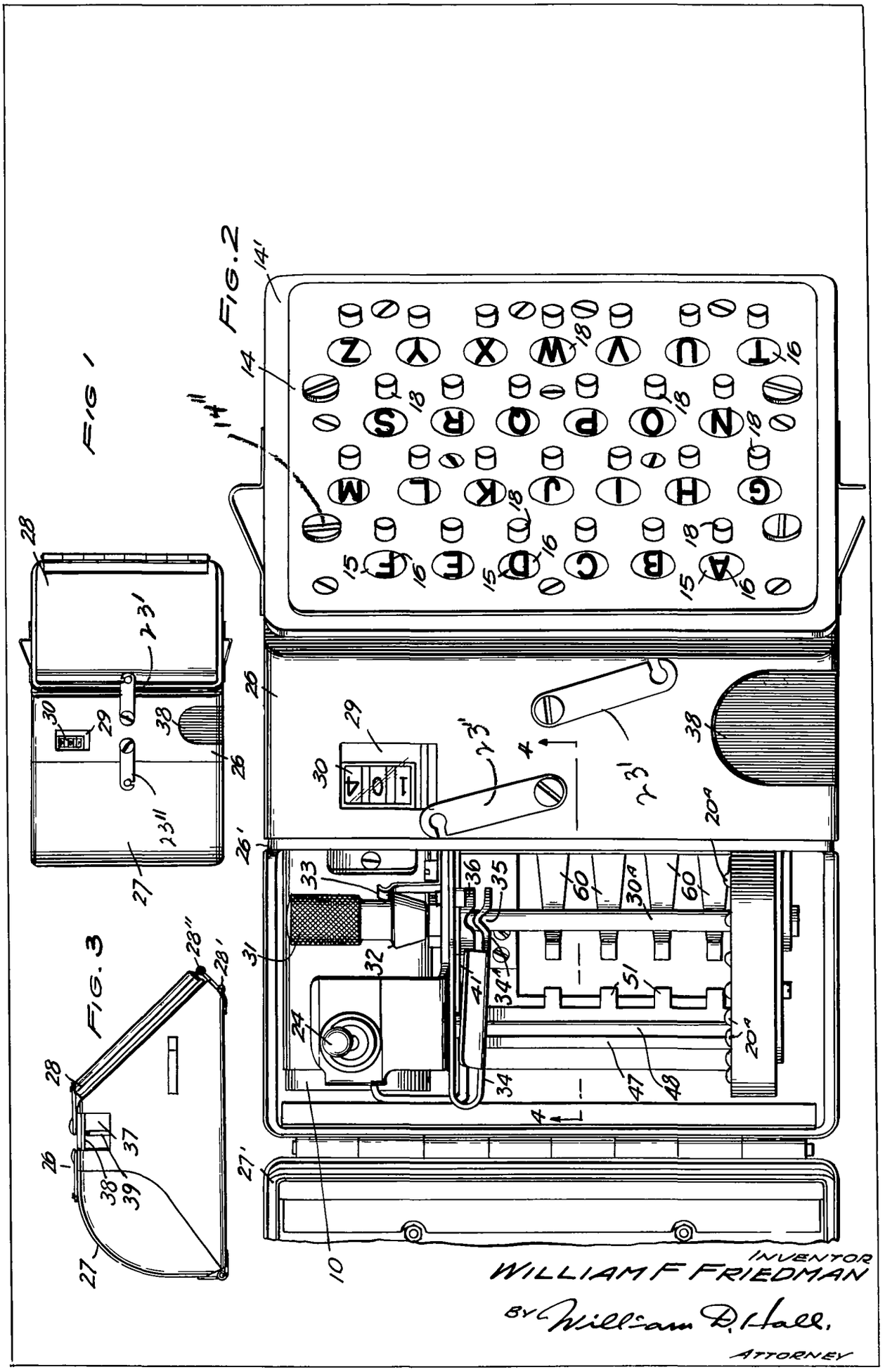


FIGURE 9

WILLIAM F FRIEDMAN
INVENTOR

William F. Friedman

ATTORNEY



POL-90

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON 25 D C

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

PAPER No 14

All communications respecting this application should give the serial number date of filing, and name of the applicant.

Please find below a communication from the EXAMINER in charge of this application

Lawrence E. Kingsland
Commissioner of Patents

MLL/cg

Henry B. Stauffer
Army Security Agency
The Pentagon
Washington 25, D. C.

GPO 16—27815-7

Division 23 room 5616
Applicant William F. Friedman

Ser No 549086
Filed August 11, 1944
For Electrical System

Responsive to the amendment filed December 10, 1947:

The drawing should be corrected by addition of legends to screw heads in Figs. 2 and 8 and also to the hasps in Fig. 2. The requirements of the remainder of paragraph 1 of the last office action is withdrawn.

Claims 1, 2, 8 and 10 appear free of patent references as at present advised.

Claims 5 to 7 are again rejected on Korn. One of the indicators is shown at 3. Switches are shown at 1a and 1b. As for the paired connections these appear obvious.

The rejection of claims 11 and 12 is repeated. The indicator in the references can be used for authentication without making any structural changes in said references.

The rejection of claims 13 and 14 is repeated. As at present advised, the process appears to be inseparably associated with the apparatus claimed. In claim 13 it should be further noted that enough steps have not been enumerated to produce the result claimed starting with "and driving" on line 3.

Claim 15 is again rejected on Korn or Scherbius. The previous ground of rejection is unpatentability and not that the claims are fully met.

The rejection of claims 16 and 17 is repeated. In Heborn No. 1,683,072 elements 4 and 37 appear to be keys and indicators arranged sufficiently adjacent each other to render the claims not patentable.

Claims 18, 19, 22 and 23 appear allowable.

Claim 24 is again rejected as not complying with R. S. 4888. Cancellation is in order.

The remaining claims are canceled.

Examiner

WAR DEPARTMENT
OFFICE OF THE JUDGE ADVOCATE GENERAL
WASHINGTON 25 D C

16 JUL 1947

Mr. William F. Friedman
1823 Que Street, N.W.
Washington 9, D. C.

Dear Sir.

By direction of The Judge Advocate General, receipt is acknowledged of your letter to the Secretary of War dated 5 June 1947, tendering to the Government of the United States for its use, under the provisions of the act of October 6, 1917, as amended (35 U.S.C. 42), the invention described and claimed in your application for patent, Serial No. 549,086, filed 11 August 1944, for Electrical System, which application and the invention covered thereby were placed in secrecy by the Commissioner of Patents on 15 May 1947. It is noted that your letter includes a power to inspect and make copies of the application.

The records of this office show that the above-mentioned application and the invention covered thereby are assigned to the United States Government and were filed under the act of March 3, 1883, as amended (35 U.S.C. 45). However, the present tender will be made of record for the protection of whatever interest you may have in this invention.

Very truly yours,

George W. Gardes

GEORGE W. GARDES
Colonel, JAGD
Chief, Patents Division

1823 Que Street, N.W.
Washington 9, D. C.
5 June 1947

Secretary of War
Washington
D. C.

Attention: The Judge Advocate General

A Secrecy Order under Public #700, 76th Congress, having recently been served upon, and acknowledged by, the undersigned in connection with Patent Application Serial Number 549,086, filed 11 August 1944, the invention covered by the said application is, in accordance with the recommendation contained in the Secrecy Order, tendered to the Government of the United States for its use. The application may be inspected and copies made, if desired.

Respectfully yours,

WILLIAM F. FRIEDMAN

(detach here)

REF ID:A70340

Form D-23 Nov '44

Secrecy ordered May 15, 47
mailed " 16
signed by me 2 June 47

Reversionary assignment made 1 Aug 44

M 325
Signing

To the applicant above named or his heirs, and any and all his assignees and attorneys or agents

Enclosed is your copy of a Secrecy Order under Public No 700, 76th Congress You are required to fill out and personally sign the receipt form above and return it to the Commissioner of Patents If the acknowledgement is not received within a reasonable time it will be necessary to take other steps to establish service of this order on you

Converter M-325

E G Haggett Jr
Patent Office War Division

Please advise this Office of change of address

Form D-2-nn

REF ID:A70340

mlc

DEPARTMENT OF COMMERCE

UNITED STATES PATENT OFFICE

WASHINGTON

MAILED

MAY 16 1947

Serial No 549,086 Filed Aug.11,1944 Division 53

For Electrical System

Applicant William F. Friedman

Assignee U S Government Assignment

SECRECY ORDER

NOTICE - To the applicant above named his heirs and any and all his assignees, attorneys and agents, hereinafter designated principals

You are hereby notified that your application as above identified has been found to contain subject matter, the unauthorized disclosure of which might be detrimental to the public safety or defense, and you are ordered in nowise to publish or disclose the invention or any material information with respect thereto, including hitherto unpublished details of the subject matter of said application, in any way to any person not cognizant of the invention prior to the date of the order, including any employee of the principals, but to keep the same secret except by written permission first obtained of the Commissioner of Patents, under the penalties of the act of October 6, 1917 (Public No 80), as amended July 1, 1940 (Public No 700) as amended August 21 1941 (Public Law 239), and June 16, 1942 (Public Law 609) 35 U S C 42, 40 Stat 394, 54 Stat 710 55 Stat 657, 540 O G 233, 248

Any other application which contains any significant part of the subject matter of the above identified application falls within the scope of this order If such other application does not stand under a secrecy order, it and the common subject matter should be brought to the attention of the Patent Office War Division

If prior to the issuance of the secrecy order any significant part of the subject matter has been revealed to any person, the principals shall promptly inform such person of the secrecy order and the penalties for improper disclosure set out in Public No 700, 76th Congress, and Public Law 239 77th Congress

This order should not be construed in any way to mean that the Government has adopted or contemplates adoption of the alleged invention disclosed in this application, nor is it any indication of the value of such invention In order to make the details of your invention available for inspection by various governmental agencies concerned therewith for consideration of its possible use in the war program and at the same time to preserve your rights under the Act, it is suggested that you promptly tender this invention to the Government of the United States for its use Such tender may be effected by a communication addressed to the Secretary of War or the Secretary of the Navy and should be accompanied by a power to inspect and make copies of the application

This order is modified by the provisions of accompanying permit A (form D-3n)

MAY 15 1947

Assistant ~~Acting~~ Commissioner

Form D-3-h

REF ID:A70340

DEPARTMENT OF COMMERCE

UNITED STATES PATENT OFFICE

WASHINGTON

Serial No 549,086 Division 53

The application is further identified in the accompanying secrecy order of this date, which refers to this permit

PERMIT A

An order of secrecy having been issued in the above-entitled application by the Commissioner of Patents, the principals as designated in said order are authorized to disclose the subject matter to any person of the classes hereinafter specified if such person is known to the principal disclosing to be concerned directly in an official capacity with the subject matter provided that all reasonable safeguards are taken to otherwise protect the invention from unauthorized disclosure The specified classes are -

(a) Any officer or employee of any department, independent agency, or bureau of the Government of the United States

(b) Any person designated specifically by the head of any department, independent agency or bureau of the Government of the United States, or by his duly authorized subordinate, as a proper individual to receive the disclosure of the above indicated application for use in the prosecution of the war.

The principals under the secrecy order are further authorized to disclose the subject matter of this application to the minimum necessary number of persons of known loyalty and discretion, employed by or working with the principals or their licensees and whose duties involve cooperation in the development, manufacture or use of the subject matter by or for the Government of the United States, provided such persons are advised of the issuance of the secrecy order

When requested in writing by a responsible official of the United States Government known to the party making disclosure to be directly concerned in an official capacity with the subject matter, authorization is further given to disclose the subject matter to accredited representative of an allied government For the sake of the record and for their protection, the principals should promptly inform the Commissioner of Patents of such disclosures together with the names and official designations of the persons to whom disclosure is made

The provisions of this permit do not in any way lessen responsibility for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and national security

Assistant Commissioner

Copy sent to

William F. Friedman,
3932 Military Rd., N.W.,
Washington, D. C.

William D. Hall,
c/o Chief Signal Officer,
Pentagon Bldg.,

Henry B. Stauffer,
Army Security Agency,
The Pentagon,
Washington 25, D. C.

WAR DEPARTMENT A70340

MEMO ROUTING SLIP

~~CONFIDENTIAL~~

1 NAME OR TITLE	INITIALS		CIRCULATE
ORGANIZATION AND LOCATION	DATE		CONCURRENCE
2			FILE
			INFORMATION
3			NECESSARY ACTION
			NOTE AND RETURN
4			SEE ME
			SIGNATURE

REMARKS

Mr. Friedman -

Attached are a copy of an amendment just filed in 549086 and a copy of the last official action in the case. The copies are for your file. — Would be glad to have your comments.

FROM NAME OR TITLE Mauffer	DATE 11 Dec 47
ORGANIZATION AND LOCATION B-Dozz	TELEPHONE 227

WD AGO FORM 1 JUN 1940 895 16—48457-1 U. S. GOVERNMENT PRINTING OFFICE

~~CONFIDENTIAL~~

IN THE UNITED STATES PATENT OFFICE

IN RE: Application of
WILLIAM F. FRIEDMAN

Serial Number
549,086

Filed
11 August 1944

For
ELECTRICAL SYSTEM

Division 53

AMENDMENT

* * * * * * * * * * *

10 Dec 47

TO: The Honorable Commissioner of Patents
Washington 25, D. C.

Sir:

This is in response to Patent Office action of 14 December 1944 in the above-identified application for patent which is being prosecuted under the so-called three-year rule. Please amend the case as follows:

IN THE SPECIFICATION

Page 3, line 21 - After "like" insert - by means of screws as 14" - .

Page 5, after
line 11 - Insert - The front and back covers when closed are secured by means of hasps 23' and 23", respectively. - .

14 - Change the period to a comma and add - which are supported and strengthened by a rod 26C. - .

Page 7, line 3 - Cancel "Figures 5 and" and insert - Figure - .

8 - After "keyboard" insert - 14 - .

15 - After "17E" insert - (Figure 7) - .

Page 8, after line 27- Insert the following paragraph - It is, in other words, the cam face 55 engaged in a peripheral slot 56 and impelled by rotary motion imparted to it by plunger 38-39 which actually serves to step the rotor. The cam face cannot, however, enter into one of the notches until the cooperating pawl enters an auxiliary notch 55D. - .

Page 10, line 24- Change "consisting" to - consist - .

IN THE CLAIMS

Claim 1, line 2- Cancel "or the like".

Claim 3 - Cancel.

Claim 4 - Cancel.

Claim 7, line 2- Cancel "or the like".

Claim 8, line 4- Cancel "or the like".

Claim 9 - Cancel.

Claim 10, line 4- Cancel "or the like".

Claim 13, line 3- Cancel "utilizing" and insert - deriving - .

Claim 14, line 6- Cancel "utilizing" and insert - deriving - .

Claim 17, line 3 - Cancel "or the like".

Claim 18, line 2 - Cancel "or".

3 - Cancel "the like".

8 - After "indicator" insert - to show the enciphered character - .

Claim 19, line 3 - Cancel "or the like".

Claim 20 - Cancel.

Claim 21 - Cancel.

Claim 22, line 2 - Cancel "or the like".

Claim 23, line 2 - Cancel "or the like".

REMARKS

The specification has been amended to include reference character 14" for the screwheads shown in Figures 2 and 8 and reference characters 23' and 23" for the hasps of Figure 2.

It is assumed that modification of the drawings can await the allowance of claims, and so no request has, as yet, been made to the Chief Draftsman. Further reason for delay in this matter is that the changes desired by the Examiner are not altogether clear. The "two parts to the right of '34' in figure 5" cannot be identified, and it is not known exactly how parts 26, 26A, 38, and 39 are to be illustrated. A simple sketch would be greatly appreciated.

The objectionable alternative expressions in the several claims have been cancelled.

The "predetermined" in Claim 1, line 8, relates to the rotation of the first cryptographic rotor. In the preferred embodiment, of course, the "predetermined angular displacement" of the first switch before the second switch steps will be 360°, but other arrangements are possible.

It is assumed that Claim 2, in view of the amendments made to the specification, will be considered allowable as soon as the drawings can be corrected.

Claims 3 and 4 have been cancelled.

Claims 5, 6, and 7 appear not to be met by the patent to Korn, 1,705,641, except that the patented disclosure contains end contacts somewhat like those in the claims. The patent on the other hand shows neither indicators nor switches associated with each one thereof, and, of course, the circuits of Korn are entirely different from those of Claim 5. Nebern, 1,683,072, likewise fails to show the switch and indicator arrangement of the Applicant. It will be noted that, according to Nebern, only the output is actuated (Page 4, lines 58 through 72). Since the reference fails to show the circuit arrangement of Claim 5, upon which Claims 6 and 7 are based, it is believed that the latter two claims should not be objectionable.

Claim 9 has been cancelled.

With regard to the objection to Claims 11 and 12, Applicant admits that most cryptographs can be used for purposes of authentication, but it would not be accurate to say that most are especially adapted for this function. These claims clearly point out the novel feature of Applicant's authenticator, that being the circuit which always produces the enciphered equivalent of a predetermined input character. Lines 51 through 80 of Page 1 of the Scherbius patent, 1,657,411, it may be noted, are directed to synchronization and to the prevention of garbles and not to authentication.

Claims 13 and 14 have been amended to substitute "deriving" for utilizing. The use to which the output signals are put would seem to be of no more importance than the manner of using the output signals of a new method of telegraphy. In the matter of functionality, it is obvious that Applicant's method could be practiced with other machines and by hand.

With reference to the rejection of Claim 15, the appearance in Korn, 1,705,641, and Scherbius, 1,657,411, of means for stressing the rotors is conceded, but Applicant's device is claimed specifically and does not seem to be fairly met by the references.

Insofar as Claims 16 and 17 are concerned, no reference shows a keyboard with keys and indicators arranged adjacent each other in pairs.

Claim 18 has been amended to point out the reason for energization of two indicators by means of each switch. The combination is not found in the prior art.

Claims 20 and 21 have been cancelled.

Continuation of prosecution under the three-year rule is desired.

Consideration and favorable action are requested.

Respectfully,

WILLIAM F. FRIEDMAN, Applicant

By _____
His Attorney

Div 253 Room 253 REF ID: A70340 Paper No 3

Address only
The Commissioner of Patents,
and not any official by name

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
RICHMOND VA

All communications respecting this application should give the serial number date of filing and name of the applicant

Please find below a communication from the EXAMINER in charge of this application

Commissioner of Patents,

MAILED

DEC 14 1944

GPO 16—27315-2

Applicant

William D. Hall
c/o Chief Signal Officer
Pentagon Bldg.
Washington, D.C.

Ser No. 549,086
Filed Aug. 11, 1944
For ELECTRICAL SYSTEM

References:

Hebern	1,096,168	May 12, 1914 35-4
Korn	1,938,028	Dec. 5, 1933 "
Korn	1,733,686	Oct. 29, 1929 "
Korn	1,705,641	Mar. 19, 1929 "
Hebern	1,683,072	Sept. 4, 1928 "
Scherbius	1,657,411	Jan. 24, 1928 "

Characters are lacking for articles that resemble screw heads in figures 2 and 8 26A and 26B should be added to figure 2. Two hasps in this figure have no characters. A shaft near the top of figure 6 has no character. A part adjacent "36" has no character. Two parts to the right of "34" in figure 5 have no characters. The part 26A in this figure should be more fully shown. The same is true of parts 26 and adjacent 38 and 39 in figure 6. The lines indicating these parts should be extended and broken away, whereby any flat surfaces concerned will be indicated. If the examiner's meaning is not clear he will send sketches showing how figures 5 and 6 should be changed. The parts in figure 5 are in especial need of change since this structure is not very well shown in figure 2.

Claims 1, 7, 18, 22 and 23 line 2; claims 17 and 19 line 3; and claims 6-10 line 4 the expression "or the like" following the recitation of a member such as "plunger" renders these claims indefinite and they are therefore rejected under Haase 1873 C.D. 170 or Phillips 1,08 C.D. 195.

Claim 1 line 8, what does "predetermined" signify? If the apparatus concerned is the part 38 to 40 the term seems unnecessary since as the device is understood the plunger 39 has to go clear down to do any good and the user cannot select any other angular

movement. There is little use in reciting that he can predetermine an angular position when the only operative position has been set when the machine was constructed.

Claim 2 would appear allowable as now advised if the specification and drawing were amended to show the structure clearly.

Claims 3 and 4 are rejected as adding nothing to claim 2 not found in the switches and rotors of the patents.

Claims 5-7 are rejected as unpatentable over Korn 1,705,641 the end contacts of which operate as claimed. The rotors are stepped and operated by means of a plunger. Again in view of Hebern of 1928 there is no invention in the plunger claimed for operating the rotors of Korn.

Claim 8 as now advised would be rendered allowable if amended to avoid the alternativeness in line 4 and if the specification and drawing were suitably amended or explained.

Claim 9 is rejected as unpatentable over the matter to which claim 8 is directed since the contacts of claim 9 are not patentably distinguishable from switch of claim 8. A normally open circuit of claim 9 is not patentably distinguishable from the circuits including switch of claim 8 since in a cryptographic device it is to be presumed that none of the circuits is closed excepting when the apparatus is being operated.

Claim 10 would be allowed if amended and the drawing and specification were amended as above suggested.

Claim 11 is rejected since any of the apparatus cited can be used as an authenticator, see particularly Scherbius lines 51-80 of page 1.

Claim 12 is rejected on Scherbius which discloses an authenticator means and a counter at 39.

Claims 13, 14 are rejected as drawn merely to the steps of using the apparatus concerned as it was intended to be used, under Foreman 1924 C.D. 47. These claims are furtner rejected as patentably indefinite in "utilizing". These steps do not state what applicant does after he has made a record. The Scherbius apparatus has a recorder. The user makes the record and utilizes the indications given by the signal lamps. These claims are rejected since when the steps are followed no change in the character or condition of any thing is made, under Cochrane v. Deener 94 U.S. 780.

Claim 15 is rejected on Korn 1,705,641 or Scherbius each of which has a means for pushing the rotors together or releasing them, in parts 28 and 27 respectively; the full equivalent of applicant's claimed cam. Notice that Korn's apparatus works with a cam.

Claims 16 and 17 are rejected as obviously unpatentable over the references.

Claim 18 is rejected as unpatentable over the reference and as containing useless matter in the last line. The claim should make it plain why any other indicator requires to be energized.

Claims 19, 22 and 23 as advised would be rendered allowable by the amendments suggested.

Claim 20 is rejected since there is no invention in the manually operable plunger over the handle of Korn or the electrically operated member of Scherbius at 27.

Claim 21 is rejected on the same ground as claim 20 the handle of Korn and the article 27 of Scherbius are means for restoring the stirrup of claim 20.

Claim 24 is rejected as unpatentable under R.S. 4886.

In the event applicant acquiesces in the rejection of the method claims page 2 lines 17, 18.

Page 5 line 17 "26A" is not found.

Page 7 line 3. Figure 5 does not show the apparatus described. Line 15 "175" is not found in figure 6.

Page 10 line 24 change "consisting" to consist.

How the parts at 55-59 etc. are operated is not sufficiently disclosed. All claims including those considered otherwise directed to patentable matter are therefore rejected.

Examiner.

IN THE UNITED STATES PATENT OFFICE

IN RE: Application of WILLIAM F. FRIEDMAN	*	
Serial Number 549,086	*	
Filed 11 August 1944	*	Division 53
For ELECTRICAL SYSTEM	*	

* * * * * * * * * * *

REVOCATION OF POWER OF ATTORNEY

TO: The Honorable Commissioner of Patents
Washington 25, D. C.

Sir:

The undersigned having, on or about the 1st day of August 1944, appointed William D. Hall, of the Office of the Chief Signal Officer, his attorney to prosecute an application for letters patent which application was filed on or about the 11th day of August 1944, for an improvement in Electrical System (serial number 549,086), hereby revokes the power of attorney then given.

Signed in the County of Arlington and State of Virginia, this 21st day of April, A. D. 1947.

Respectfully,

William F. Friedman

William F. Friedman, Applicant

IN THE UNITED STATES PATENT OFFICE

IN RE: Application of
WILLIAM F. FRIEDMAN

Serial Number
549,086

Filed
11 August 1944

For
ELECTRICAL SYSTEM

Division 53

* * * * * * * * * * *

POWER OF ATTORNEY

TO: The Honorable Commissioner of Patents
Washington 25, D. C.

Sir:

The undersigned having, on or about the 11th day of August 1944, made application for letters patent for an improvement in Electrical System (serial number 549,086), and having this day revoked a power of attorney given on or about the 1st day of August 1944 to William D. Hall, of the Office of the Chief Signal Officer, hereby appoints Henry P. Stauffer, of Arlington County, Virginia, his attorney, with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office, connected therewith.

Signed in the County of Arlington and State of Virginia this 21st day of April, A. D. 1947.

Respectfully,

William F. Friedman, Applicant

REF ID:A70340

SIGFOY M 375

WAR DEPARTMENT
ARMY SERVICE FORCES

COPY

TRANSMITTAL SHEET

File in SIGDE file

Office of the Chief Signal Officer — Action 1 — SPSLG-3a

TO	Signal Security Division (Service division or organization)		3C 340 (Location)
	(Branch or unit)		Sgt. Stauffer (Attention)
Subject	Forms of Mr. William F. Friedman		
File No			
	Mr. Farnum (Writer's last name)		8 August 1944 (Date)
FROM	Legal Division (Service division or organization)	4D 333 (Location)	72416 (Telephone extension)

Forwarded herewith are the forms for patent application of William F. Friedman, title "Electrical System" which you requested on your visit to this office on 3 August 1944 for your files.

App No #549,066 11 Aug 1944

/s/ H. D. Newton, Maj., SigC
for Raymond J. McElhannon
Major, Signal Corps
Assistant Patents & Inventions Counsel
Legal Division

1 Incl
4 Forms (in dupl.)

W D, A G O Form No 0105
March 27 1943

COPY

24-20956

DEVELOPMENT BRANCH

DATE Aug Document No.____

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W. F. Friedman

Information & Return____ Typing ____
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As requested

SECRET CONFIDENTIAL RESTRICTED

PETITION

TO THE COMMISSIONER OF PATENTS:

Your petitioner, William F. Friedman, a citizen of the United States residing at 3932 Military Rd., N. W. in the County of Washington and State of D. C. and whose post-office address Washington, D. C. pray that Letters Patent may be granted to him for the improvement in ELECTRICAL SYSTEM set forth in the annexed Specification.

And he hereby irrevocably gives control of his application for Letters Patent to the Secretary of War, and appoints William D. Hall, whose post-office address is care of the Chief Signal Officer, Pentagon Building, Washington, D. C., attorney with full power of substitution and revocation to prosecute this application, to make alterations and amendments therein, to sign his name to the drawings, to receive the Letters Patent, and to transact all business in the United States Patent Office connected therewith.

Signed at _____ in the County of Arlington and State of Virginia this 1 day of August 19 44

(Sign here /s/ William F. Friedman
(first name in full)

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN, That William F. Friedman, a citizen of the United States residing at 3932 Military Rd. in the County of Washington and State of D. C. have invented certain new and useful improvements in ELECTRICAL SYSTEM of which the following is a specification:

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

24-67424-200

IN TESTIMONY WHEREOF I affix my signature.

~~/s/ William F. Friedman~~

(Sign here, first name in full)

O A T H

~~State of Virginia~~)
) ss.
County of Arlington)

William F. Friedman, the above-named petitioner, being sworn (or affirmed), deposes and says that he is a citizen of the United States of America and resident of 3932 Military Rd., N.W., Washington, D. C., that he verily believes himself to be the original, first, and sole inventor of the improvement in ELECTRICAL SYSTEM described and claimed in the annexed specification; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this application; that said invention has not been patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months prior to this application; and that no application for patent on said improvement has been filed by him or his legal representatives or assigns in any country foreign to the United States.

/s/ William F. Friedman

(Sign here, first name in full)

SWORN to and subscribed before me this 1st day of August, 19 44.

/s/ Marie Susan Palmer
Notary Public

(Seal here, to be impressed in paper.)

24-61699ABCD

REF ID:A70340

ASSIGNMENT

WHEREAS, , William F. Friedman, a citizen of the United States, have invented certain improvements in ELECTRICAL SYSTEM for which the undersigned on even date herewith executed an application for Letters Patent of the United States; and

WHEREAS, the Government of the United States is desirous of acquiring the entire right, title and interest in and to the said invention and in and to any patents that may issue thereon:

NOW, THEREFORE, in consideration of the premises and one dollar ($1.00), the receipt of which is hereby acknowledged, the undersigned has sold, assigned and transferred, and by these presents does hereby sell, assign and transfer unto the Government of the United States of America, as represented by the Secretary of War, the entire right, title and interest, throughout the United States of America, and the territories and dependencies thereof, and not elsewhere, in and to the said invention and to the invention as described in the specification executed by the undersigned on even date herewith, preparatory to obtaining Letters Patent in the United States therefor, and to all Letters Patent issuing thereon and any continuations, continuations-in-part, divisions, reissues, or extensions of such Letters Patent; the said entire right, title and interest as well as the control of the prosecution of the application and all continuations, continuations-in-part, divisions, reissues, or extensions thereof as where are or that may be granted, to be held by the Government as fully and entirely as the same would have been held by me had this assignment and sale not been made. The undersigned hereby gives the Government of the United States of America the non-exclusive right to make, use or sell the said invention for governmental purposes in all foreign countries.

Provided, however, that upon any subsequent notice of allowance of said application or of any substitutions, divisions, continuations, or continuations-in-part being given by the Commissioner of Patents, or upon the declaration by the Commissioner of Patents of an interference involving said application or any substitutions, divisions, continuations, or continuations-in-part, the entire right, title and interest in and to said invention and said application or any substitutions, divisions, continuations, or continuations-in-part, and such patents as may be issued thereon will thereupon revert to myself subject to an irrevocable, non-exclusive, and royalty-free right and license remaining vested in the United States of America as represented by the Secretary of War, to make, have made, to use, and to sell the subject matter of said invention for governmental purposes, to the full end of the term or terms for which any Letters Patent, divisions, reissues, extensions, continuations, or continuations-in-part are or may be granted.

/s/ Floyd W. Tomkins, Jr.
Witness

/s/ William F. Friedman

Before me, a notary public in and for the State of Virginia Arlington, Va appeared the above-named William F. Friedman personally known to me, who in my presence executed the foregoing assignment and acknowledged that his execution thereof was his free act and deed.

Signed at _____ this 1st day of August 1944.

/s/ Marie Susan Palmer
Notary Public

24-74734ABCD-200

LICENSE

WHEREAS, William F. Friedman, a citizen of the United States; and;

WHEREAS, in pursuance of said employment the undersigned has invented certain improvements in

ELECTRICAL SYSTEM

for which the undersigned is about to make application for Letters Patent of the United States; and

WHEREAS, the nature of my employment, and the conditions and circumstances under which said invention was made, are such as to justly and lawfully entitle the Government of the United States of America to have a non-exclusive license and right to make and use said invention, together with any and all improvements thereon and inventions relating thereto that the undersigned has made or may hereafter make while employed and engaged by the United States Government;

NOW, THEREFORE, in consideration of the premises the undersigned does hereby give and grant unto the Government of the United States of America a non-exclusive license to make, to have made, to use and/or to sell, said invention as described in the specification executed by the undersigned on even date herewith, said non-exclusive license to extend to any and all Letters Patent which may be granted for said invention, (including all divisions, reissues, continuations, and extensions thereof) together with any and all improvements thereon and inventions relating thereto made by the undersigned while employed or engaged by the United States Government, or for which the undersigned may hereafter make application for Letters Patent while employed or engaged by the United States Government, reserving to the undersigned in each case the unrestricted possession of all other patent rights not hereby or otherwise licensed to the Government of the United States of America. Said license hereby granted or agreed to be granted shall extend throughout the United States, its territories and dependencies, and all foreign countries and shall continue in force for the full term for which said Letters Patent may be granted.

SIGNED at Arlington County, State of Virginia

1st day of August, 19 44

Signed:

/s/ Mark Rhoads

/s/ Mary C. Thompson

/s/ William F. Friedman

F3049

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This invention relates to a device or machine, which may be used either as a cryptograph for enciphering and deciphering communications, or as an authentograph for testing the authenticity of messages.

The primary object of this invention is to provide a cryptograph or cipher device which is simple in construction and maintenance, but nevertheless affords a high degree of security, is light and readily portable, and can be readily disassembled and rearranged to vary the cipher keying elements.

Another object of this invention is to provide an authentograph, that is, a device for testing the authenticity of a message or signal, thereby providing means for assuring that such a message or signal originated at an authorized source and is to be considered authentic.

An additional object is to provide a novel keyboard for use with a cryptograph and an authentograph.

Another object is to provide a novel method for the authentication of messages.

Other objects of the invention will become apparent from a reading of the following specification and claims.

In the drawings:

Figure 1 is a top or plan view with the covers closed.

Figure 2 is a top or plan view on an enlarged scale with the keyboard cover and parts of the rotor cover omitted.

Figure 3 is a side elevation with the covers closed.

Figure 4 is a cross section on line 4-4 of Figure 2 with the rotor cover omitted.

Figure 5 is a perspective view of the rotor latch.

Figure 6 is a perspective view of the rotor actuating mechanism.

Trial Form
Enlarged 1 Aug 44

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Figure 7 is a diagram showing schematically the electric circuits and the mechanical operating mechanisms.

Figure 8 is a view of a portion of the device, illustrating a modified keyboard and switching means.

Figure 9 is a view of a rotor such as is used in the device of this invention.

The embodiment of the invention selected from among others for illustration in the drawings and description in the specification is as follows. Referring to Figure 7, the device will be seen, in general, to consist of a source 10 of electricity, connected to a pair of wires 11 and 12 across which are connected a plurality (in this instance, twenty-six) indicators 13A, 13B, 13C, etc. These indicators are illustrated as being electric lamps arranged beneath a keyboard and indicator panel 14 (see Figure 2) and each arranged to illuminate one perforation closed by a transparent cover 15 bearing one letter 16 of the alphabet thereon. Panel 14 is secured in place over a gasket 14' of soft rubber or the like. Across lines 11 and 12 are also connected manually operable switches 17A, 17B, 17C, etc., each in series with one of the indicators 13A, 13B, etc., arranged for operation by pushbuttons 18 projecting through keyboard 14 in proximity to the covers 15.

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Connected to each of the indicators 13A, 13B, etc., is a multicontact electric switch, generally indicated as 19. It comprises a number of relatively juxtaposable and rotatable cryptographic switching wheels or rotors, 19A, 19B, 19C, and 19D, in cascade, each rotor having a plurality of spring input and output contacts 19' thereon (see Figure 9), and a final wheel 19E, which may hereinafter be called the reflecting rotor or reflector, the output contacts of which are connected in pairs, as shown diagrammatically at 20' in Figure 7. Each electrical path, as 20, through the rotor system 19 leads from one stationary contact 20" through the cryptographic rotors, and back, through 20", to another stationary contact 20". These paths or circuits 20 are rearranged each time one of the rotors is turned.

In conductor 11 there is a normally-closed electric switch 21. Between one of the indicators, in this case 13E, and multi-contact switch 19, there is a normally-closed electric switch 22. In parallel with wire 11 is wire 11A containing an authenticating switch 23 having an operating handle 24. Wire 11A also contains a normally-open switch 25.

Turning now to Figures 1, 2, and 3 for a disclosure of the mechanical features of the invention, the device is shown as enclosed in a casing 26 to which are hinged or otherwise attached a back cover 27 and a front cover 28.

The front cover, protecting the keyboard, is secured to casing 26 by means of a double hinge 28', 28". This arrangement permits the cover to fit snugly upon gasket 14', thereby to provide a substantially dust-proof and water-proof closure for the keyboard 14, and yet permits it to lie flat in front of the machine or to be folded therebeneath. The back part of the casing 26, adjacent the rotor assembly, is provided with a lip 26' (see Figure 2). Back cover 27 is adapted to fit over this lip, and has a gasket 27', which provides, upon closure of the back cover, a dust-proof and moisture-proof seal.

In the top of casing 26 there is an opening 29 through which a counter 30 is visible. As is most readily seen in Figure 6, casing 26 has two projecting walls 26A and 26B. The cryptographic switching assembly 19 is retained between these walls by a mechanism which will now be described. Wall 26A has an orifice therein through which may be pushed pin 30A having a knurled head 31 (Figure 2) and a latch 32 cooperating with a retaining spring 33. Also pivoted on wall 26A is a spring latch 34 of U-shape, one arm being bent back parallel to the other. The free end 34A of latch 34 is perforated to allow pin 30A to pass through it and bears cam surfaces 35 thereon. Stationary cam 36 has a surface complementary to cam surfaces 35 so that when latch 34 is moved from the

substantially horizontal position, in which it is shown in Figures 3, 4, and 6, into the vertical position, in which it is shown in Figure 5, the free end 34A of latch 34 is moved away from wall 26A and compresses the entire rotor-reflector assembly so as to insure good contacts through the spring contacts 19' thereof.

The manually operated means for rotating the cryptographic rotors 19 will next be described. As seen in Figures 1, 2, 3, and 6, casing 26 has a recess 37 in its top into which fits a plunger consisting of fingerpiece 38 having a sliding fit in the recess and a rod 39 upon which the fingerpiece is mounted. Rod 39 causes U-shaped stirrup 40 to turn on its pivots in walls 26A and 26B. On stirrup 40 is a cam 41, which actuates follower 42 fast on shaft 43 of counter 30. Stirrup 40 also has a member 44 to which spring 45 is attached and which carries cam face 46. Detent 47 is pivoted at 48 in walls 26A and 26B and is stressed by spring 49 so that cam 50 engages cam face 46. Spring detents 60 normally hold rotors 19 in their relative positions but allow movement of these rotors under the actuation of pawls 58. Detent teeth 51 are moved in and out of the ratchet depressions in the surface of the rotors 19 upon each movement of stirrup 40, as will be hereinafter further described.

Stirrup 40 carries a pin 52 on which are pivoted a plurality of cam-and-pawl devices, 53A, 53B, 53C, and 53D, which are urged by springs 54 against the rotors (see Figures 5 and 9). Device 53B, for example (Figure 6), has a cam 55B and a pawl 58B, and these are adapted to cooperate, respectively, with ratchet depressions 56 of rotor 19A and pawl notch 56D on the rotor 19B.

The operation of this device is as follows: Cover 28 is opened to expose the keyboard. If, as frequently happens, limitations of space require, the cover may be folded back beneath the machine. For enciphering or deciphering, handle 24 is operated so that switch 23 is open. That push button 18 which is associated with the desired letter is depressed and the switch controlled thereby is operated. For example (to encipher the letter E), if push button 18 associated with the letter E is depressed, switch 17E is thereupon closed, and connection is made from battery 10 through line 11, switch 21, line 11B, switch 17E, lamp 13E, and line 12 back to source 10, illuminating lamp 13E. This action also closes connections from battery 10 through lines 11, 11B, through switch 17E, then along line 11C, through switch 22, line 20, thence through rotors 19A, B, C, D and reflector 19E, rotors 19D, C, B, A, to line 20B, lamp 13Z, thence through line 12, back to source 10. Lamps 13E and 13Z, are simultaneously lighted, and this indicates that the cipher equivalent of the letter E is Z. To decipher the letter Z, the push button 18 associated with the letter Z is depressed and the circuit is as follows: battery 10, line 11, switch 21, line 11D, switch 17Z, line 20B, through the

rotor-reflector assembly, line 20, switch 22, line 11C, lamp 13E, line 12, back to battery 10. Lamp 13E would be illuminated, giving E as the plain-text equivalent of Z. At the same time the lamp 13Z would also be lighted by the closing of switch 17Z and by a circuit which is essentially similar to the one described in connection with the closing of switch 17E. Thus, since rotors 19 connect all the lamps 13A, 13B, etc., and all the switches 17A, 17B, etc., together in pairs, each letter has another corresponding to it.

For rotating the cryptographic rotors 19 and thus varying the connections between the various pairs of lamps 13 and switches 17, the plunger 38 is depressed, stirrup 40 is rotated about its pivots and the members 53A, etc., moved. A pawl 58 will normally ride on a rim 57 of a rotor, and, under these conditions, its associated cam face 55 can not enter a ratchet depression to step an adjoining rotor notwithstanding the urging of its spring 54. As soon, however, as a pawl falls into a pawl notch 55D it and its cam member move upwardly somewhat and toward the rotors and the latter engages a ratchet depression. Then, on movement of stirrup 40, the rotor in question is stepped. It will be noticed that, in view of the manner in which tang 59 of device 53A underlies device 53B, etc., device 53A can not move upwardly unless device 53B has so moved. The pawl member of device 53D rises on each operation of stirrup 40, as it drops over shoulder 58' of member 60'. The result is that rotor 19E steps each time the stirrup 40 moves, rotor 19D steps once for each revolution of 19E, 19C steps once for each revolution of 19D, etc.

Whenever a cam 55 drops into a notch 56, and the movement of the plunger 39 is completed, the corresponding rotor 19 is moved one step. This re-arranges the connections through the rotors and connects different pairs of lamps 13A,

etc., together. Counter 30 is moved one numeral because follower 42 is depressed by cam 41 and spring returned. Detent 47 prevents overstepping of the rotors 19 because teeth 51 enter notches in rotors 19.

A detailed description of the operation of the device as an authentograph for insuring the authenticity of a message or a signal will now be given. Assuming that agreement has been previously reached by the two parties concerned as to the wiring of the several rotors and their arrangement in the device, the counter is set to zero, and switch 23 is closed by snapping handle 24. Plunger 39 is then depressed, opening switches 21 and 22 and closing switch 25. This movement moves counter 30 one position forward and also one or more rotors 19 one step. The following circuit is then established; Source 10, line 11, line 11A, closed switch 23, closed switch 25, line 20, thence through the rotor system to whichever lamp happens to be paired with lamp 13E at the moment. Suppose it to be K. The circuit to lamp 13E is at this time open at switch 22 so that lamp E is not illuminated but only the lamp corresponding to its enciphered equivalent, namely, K. The letter which is thus paired with 13E becomes an authenticator, which will, of course, be duplicated on a machine similarly set to the same key.

Now suppose that the device is being used to authenticate a plain-language message sent from station A to station B. Having transmitted the message, station A operates its device and finds the authenticating letter to

be K, for example. This letter is transmitted as the authentication; station B, operating its device, finds that K is correct and hence is warranted in its belief that the message comes from an authorized source. Upon the next authentication, the letter will be different, since one or more of the rotors will have been advanced on the operation of the plunger 38.

To remove the rotors 19, cover 27 is opened, latch 34 moved from the upright position of Figure 5 to the horizontal position of Figure 6 which allows cam 35 to enter the corresponding groove in stationary cam 36. The compression on the rotor assembly is relieved and, when pin 30 is removed, the rotors can be readily lifted out. To replace the rotors they are merely set in their approximate positions, pin 30 pushed through wall 26A up to its head 31, and latch 34 raised. In the preferred embodiment, the latch, when lowered, extends beyond the end of wall 26A. It thus prevents the closing of the rear cover 27. Since the back cover should normally be closed, the feature mentioned serves to assure that the latch will be up and the rotor-reflector assembly properly compressed.

The modifications of Figure 8 included a viewing panel 60, similar in appearance to the viewing panel and keyboard 14 of Figure 2. In place of push buttons 13, however, viewing panel 60 is provided with contacts only, as 61. These contacts, as shown, consisting merely of small circular elements of conducting material all connected by a common return wire 12 to the battery 10. With reference to Figure 7, contacts 61 may be considered as replacing switches 17A, 17E, etc. In place of the push buttons 18, a stylus 62 is provided and this may be considered to be connected to conductor 11 of Figure 7. Encipherment or decipherment is accomplished by making contact between stylus 62 and a desired contact 61 on panel 60.

The above description is in specific terms, but it is to be understood that the invention is not limited to the precise structures and circuits shown and described. Instead, for the true scope of the invention, reference should be had to the appended claims.

I claim:

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1. In a cryptograph having relatively rotatable electric switches arranged in cascade therein, a plunger or the like arranged for manual operation, means associated with said plunger and cooperating upon depression thereof with one of said electric switches for angularly displacing the same, means associated with said plunger and cooperating upon depression thereof with another electric switch for angularly displacing the same after a predetermined angular displacement of said first mentioned switch, and a brake operable by said plunger through a lost-motion connection for preventing more than a desired angular displacement of any switch.

2. In a cryptograph, the combination of a source of current, a plurality of input and output contacts, a plurality of indicating devices each with a normally open circuit between it and an input contact and a normally open circuit between it and every output contact, and a switch associated with each of said indicating devices and adapted when closed to complete its said first mentioned circuit and one of said second mentioned circuits.

3. The combination of Claim 2, further characterized by means for varying the selection of a second mentioned circuit to be completed upon the closing of a switch.

4. The combination of Claim 2, further characterized by a plurality of mixing rotors, the normally open circuit between a said indicating device and the said output contacts including said rotors.

5. In a cryptograph, a plurality of cryptographic rotors, stationary input and output contacts adapted to be connected variably in pairs through said rotors, an indicator connected to each of said stationary contacts, a switch associated with each indicator, and a source of current whereby the closing of one of said switches will close a circuit through a selected input contact and its associated indicator and an output and its indicator.

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6. The invention of Claim 5, further characterized by means for stepping the rotors.

7. The invention of Claim 5, further characterized by a plunger or the like adapted when depressed to step a rotor.

8. The combination with a cryptographic device having a plurality of electrical inputs for the characters to be enciphered, a plurality of electrical outputs for the enciphered equivalents of said characters, a viewing panel or the like including a lamp for each character, a switch associated with each lamp and with a source of current, and a plurality of circuits each including said source, one of said switches, a lamp associated therewith, an input corresponding to the character represented by said lamp, and a lamp corresponding to the output associated with the last mentioned input, whereby the closing of one of said switches will light a lamp representing a character to be enciphered and a lamp representing the enciphered equivalent of said character.

9. In a cryptograph, the combination of a plurality of electrical inputs for the characters to be enciphered, a plurality of electrical outputs for the enciphered equivalents of said characters, a source of current, a viewing panel or the like including a lamp for each character, an electrical contact associated with each lamp, a contacting member, and a plurality of normally open circuits each including said source, said contacting member, one of said electrical contacts, the lamp and input corresponding to the character associated with said contact, and a lamp corresponding to the output associated with the last mentioned input, whereby a contact between said contacting member and one of said contacts will light a lamp representing the enciphered equivalent of said character.

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10. In an authentograph, a source of current, a plurality of cryptographic rotors, stationary contacts adapted to be connected in pairs variably through said rotors, an indicator connected to each of said stationary contacts, a plunger or the like adapted when depressed to displace angularly one or more of said rotors, a switch controlling a circuit between one stationary contact and another stationary contact and its indicator, and a further normally open switch adapted to be closed by said plunger thereby to energize the indicator associated with said output only if said additional normally open switch is closed.

11. In a combination with a cryptographic device adapted to receive input signals representing characters to be enciphered and to mix the signals and to indicate to an operator both input and enciphered characters, an authenticator adapted when actuated to indicate the output character associated with a predetermined input character.

12. In combination with a cryptographic device adapted to receive input signals representing characters to be enciphered and including a set of cryptographic rotors in cascade for mixing the signals, means for indicating to an operator both input and enciphered characters, means for stepping the rotors, and means for recording the steps of said rotors, and an authenticator adapted when actuated to indicate only the enciphered character instantaneously associated with a predetermined input character.

13. The method of providing an authentication for a message comprising characters enciphered by a set of cryptographic stepping rotors which includes recording the steps of the rotors and utilizing the enciphered equivalent of a predetermined character after a predetermined number of steps of said rotors.

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14. The method of authenticating a message by characters enciphered by an electrical system of stepping cryptographic rotors having an input contact and an output contact for each character which comprises providing a circuit including a predetermined input contact and an output contact dependent upon the instantaneous positions of said rotors, and utilizing the enciphered equivalent of the character associated with said predetermined input contact for known conditions of said rotors.

15. In a cryptograph containing a plurality of rotors in cascade, a latch for stressing said rotors in position, comprising a U-shaped member of spring material having one end pivotally mounted and the other end free for longitudinal movement into and out of contact with one end of the said rotors, a cam surface on said free end, and a stationary cam cooperating with said cam surface to move said free end when said latch is turned about its pivot.

16. In a keyboard for a device of the character described, a switching element for each character which may be utilized in operation, each of said switching elements being adapted upon actuation to operate a switch, and an indicator adjacent each switching element.

17. In a keyboard for a device of the character described, a switch for each character which may be utilized in operation, a push button or the like extending through the keyboard and adapted upon depression to close a switch, an indicator for each character which may be utilized in operation, each of said indicators being adjacent to one of said push buttons, and means for connecting said indicators and said switches whereby the depression of a push button will energize at least one indicator.

18. In a keyboard for a device of the character described, a switch for each character which may be utilized, a push button or the like extending through the keyboard and adapted upon depression to close a switch, an indicator for each character which may be utilized, each of said indicators being adjacent to one of said push buttons, and means for connecting said indicators and said switches whereby depression of a push button will energize the indicator adjacent thereto and another indicator.

19. In a device of the character described utilizing rotors having ratchet depressions in the periphery thereof and a pawl notch, means for stepping the rotors including a stirrup or the like having a limited rotary movement, means for normally holding said stirrup in an inoperative condition, a plurality of cam-and-pawl devices carried by said stirrup, a cam being adapted for cooperation with a ratchet depression of a rotor and a pawl being adapted for cooperation with a pawl notch of another rotor, means for moving said stirrup, means dependent upon said movement for causing a cam of a cam-and-pawl device to cooperate with a ratchet depression of a rotor, and means for preventing another cam from cooperating with a ratchet depression of another rotor unless the pawl of said last mentioned cam-and-pawl device is also cooperating with a pawl notch.

20. The invention of Claim 19, further characterized by a manually operable plunger for moving said stirrup.

21. The invention of Claim 19, further characterized by means for restoring said stirrup to its inoperative condition after movement.

22. The invention of Claim 19, further characterized by means including detent teeth or the like dependent upon movement of said stirrup for moving into engagement with ratchet depressions of the rotors, thereby to prevent overstepping thereof.

23. The invention of Claim 19, further characterized by spring detents or the like adapted to rest in the ratchet depressions of the rotors to inhibit the rotation thereof.

24. A cryptographing and authenticating machine substantially as shown and described.

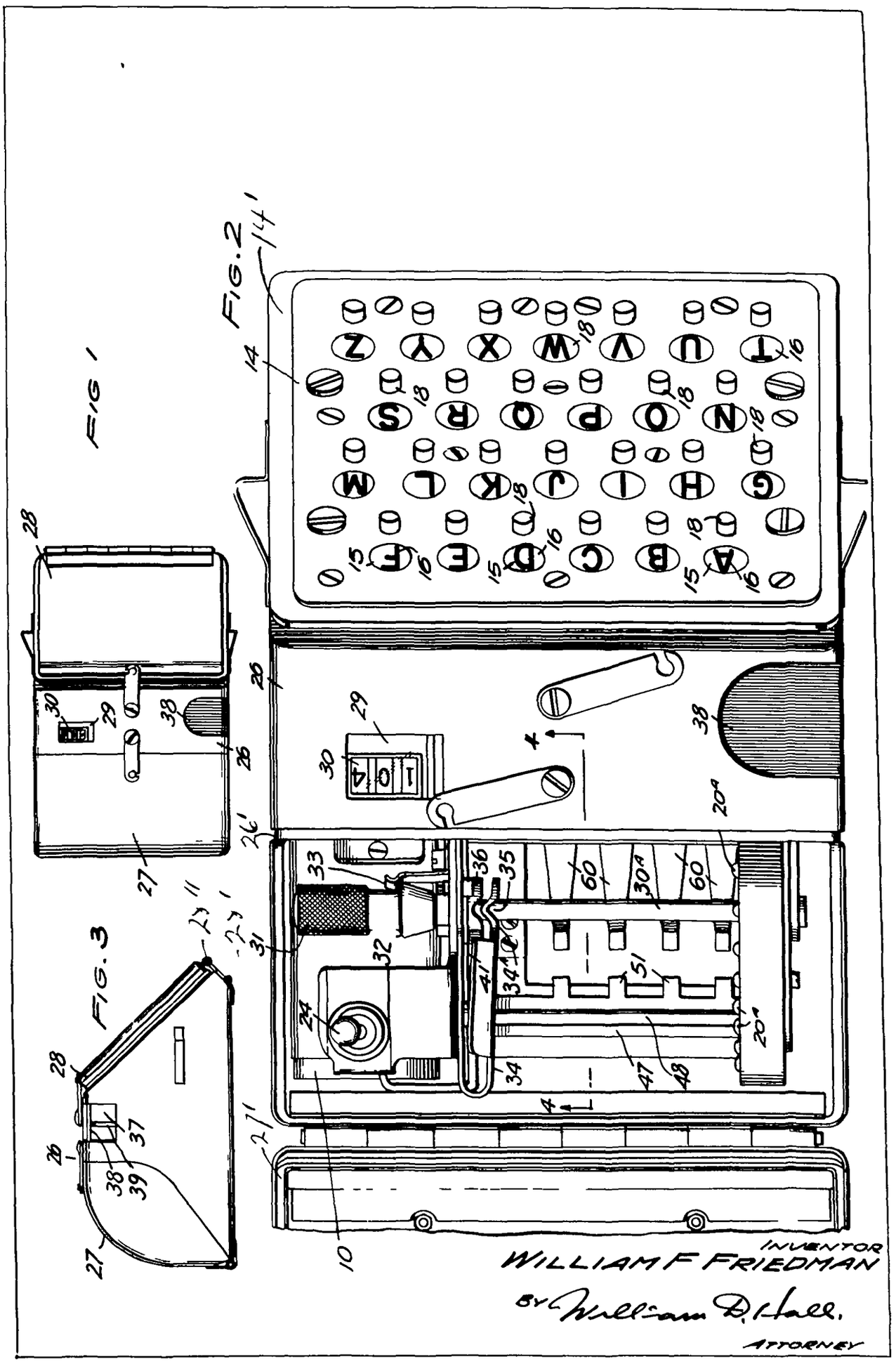


FIG 4

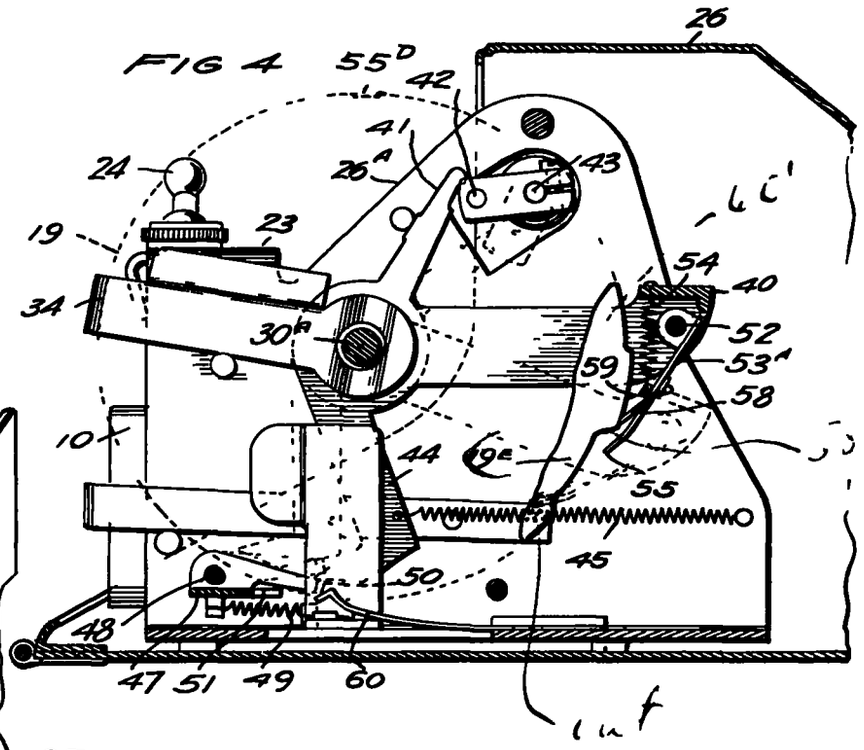


FIG 5

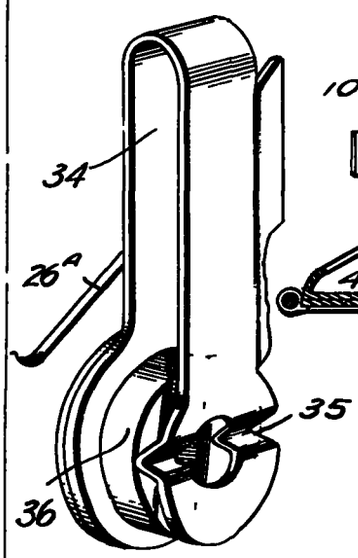
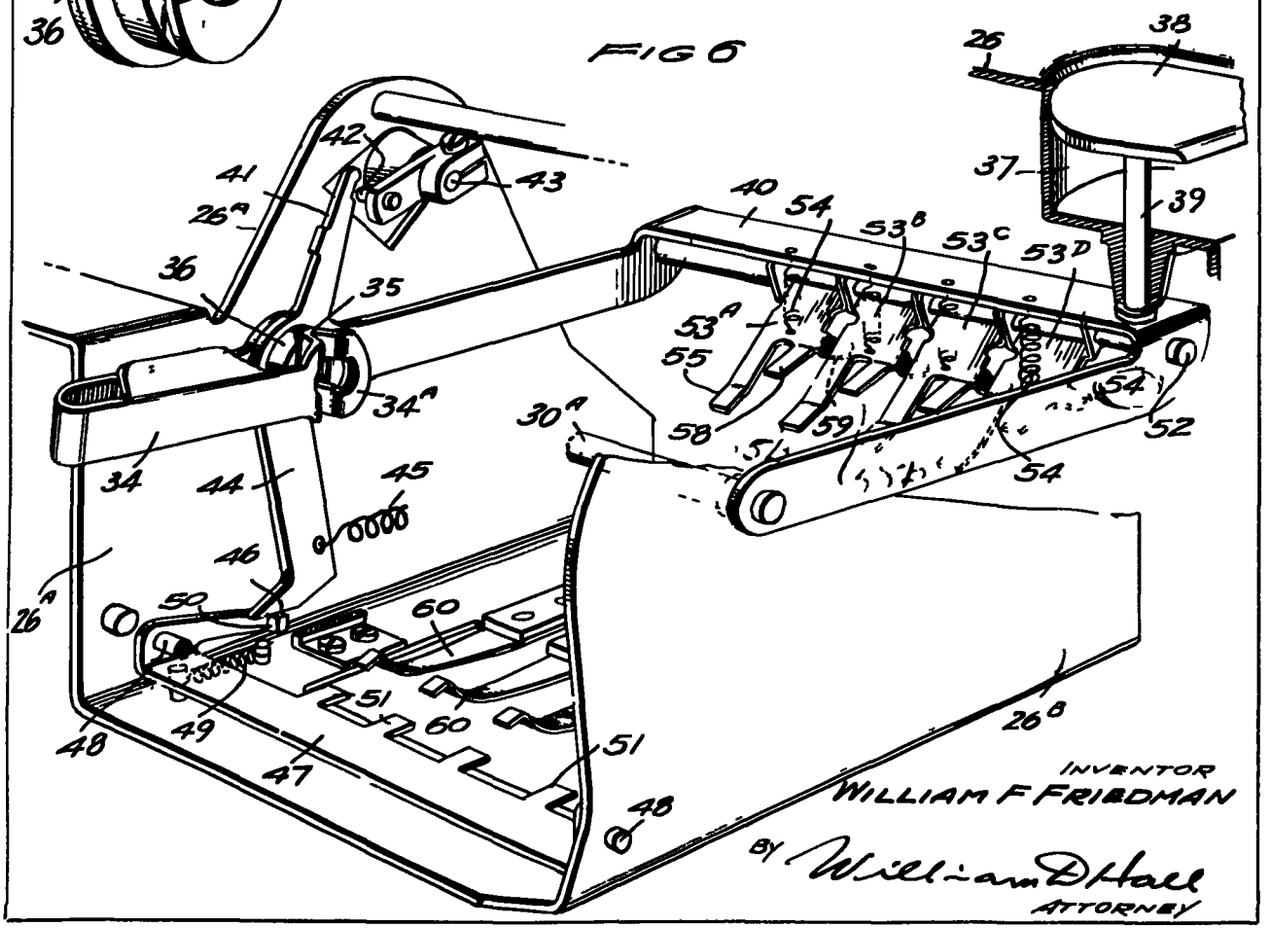


FIG 6



INVENTOR
WILLIAM F FRIEDMAN
BY William D Hall
ATTORNEY

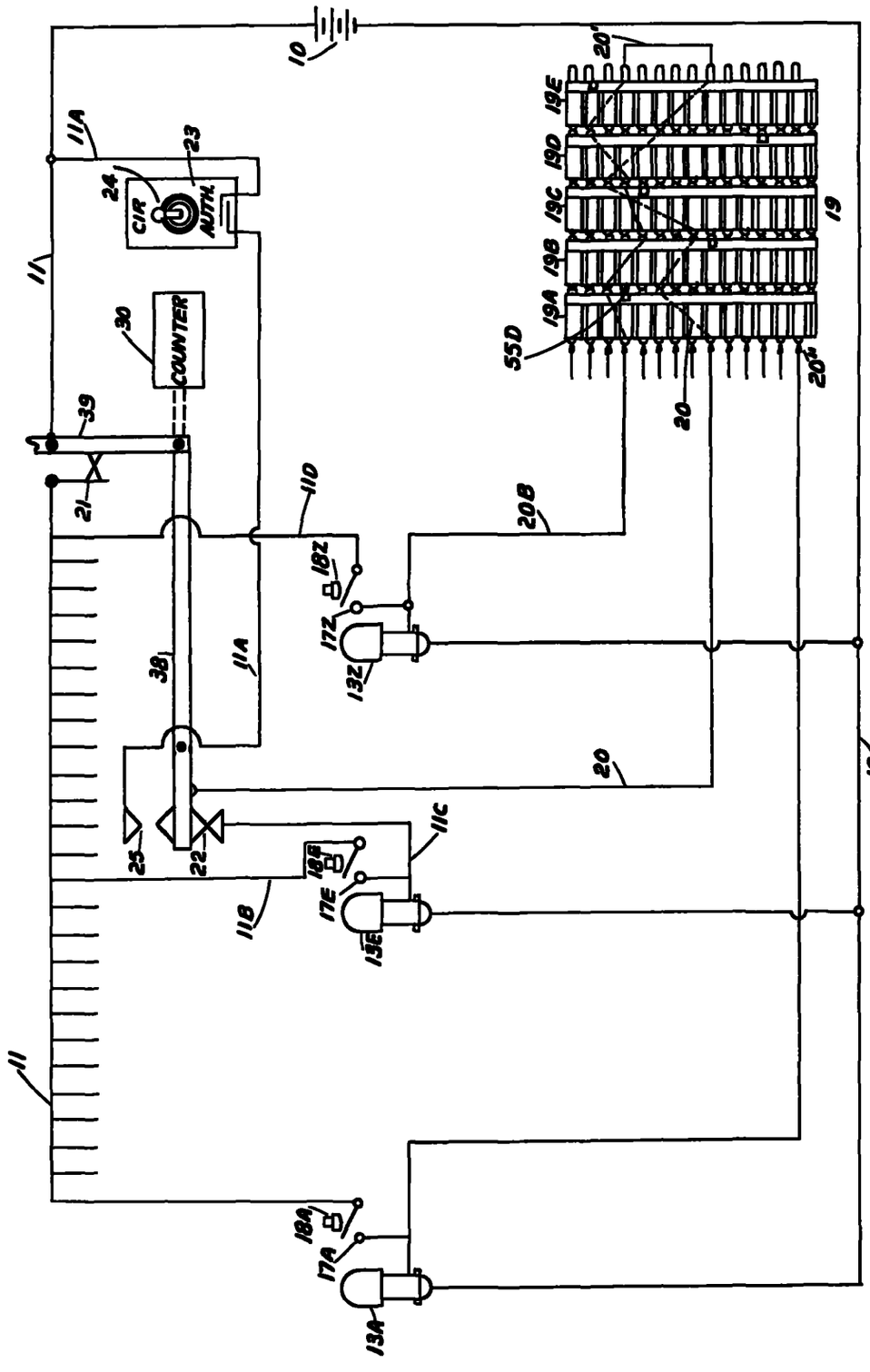


FIGURE 7

WILLIAM F. FRIEDMAN
INVENTOR

ATTORNEY

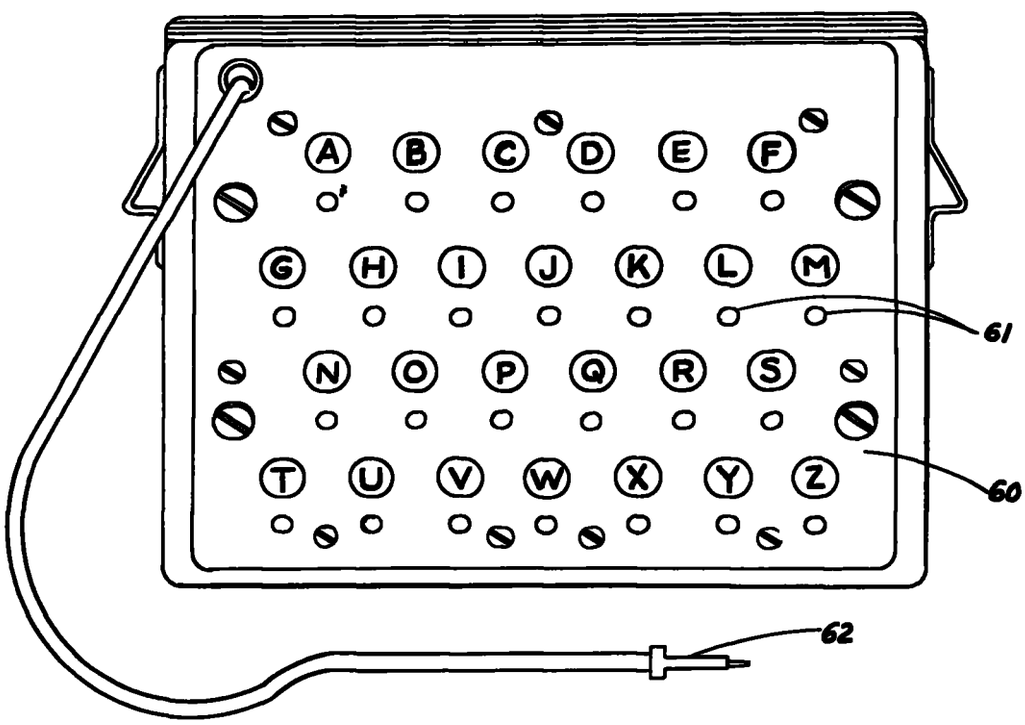


FIGURE 8

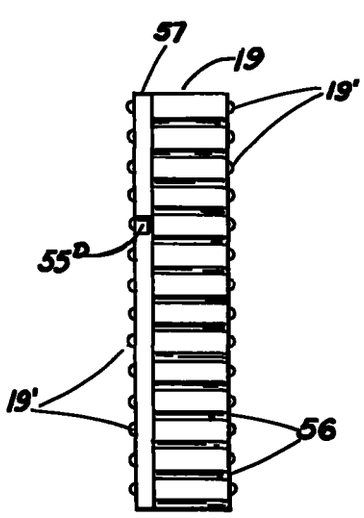


FIGURE 9

WILLIAM F. FRIEDMAN
INVENTOR

ATTORNEY

IN TESTIMONY WHEREOF I affix My signature

William F. Friedman

(Sign here, first name in full)

OATH

City of Washington)
) ss
District of Columbia)

William F. Friedman

the above named petitioner, being sworn, deposes and says that he is a citizen of the United States and resident of Washington, D. C.; that he verily believes himself to be the original, first, and sole inventor of the improvement in Electric Cryptographic Devices

described and claimed in the annexed specification, that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this application, that said invention has not been patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months prior to this application, and that no application for patent on said improvement has been filed by him or his representatives or assigns in any country foreign to the United States, ~~except as follows:~~

Note: Legal Division reports that they prefer to "kill" this & hold in files. Will submit later pat application instead. W.F.F. 8 Aug 44

William F. Friedman

(Sign here, first name in full)

SWORN to and subscribed before me this 6th day of December, 19 41

(McElaney)

Notary Public

(Seal here, to be impressed in paper)

W-3952-1, A C

REF ID:A70240

PETITION

TO THE COMMISSIONER OF PATENTS

Your petitioner, William F. Friedman, a citizen of the United States residing at Washington in the County of ~~[illegible]~~ and State of ~~[illegible]~~ District of Columbia and whose post-office address 3912 Military Road, Washington, D. C. pray that Letters Patent may be granted to him without payment of fee, pursuant to the provisions of the Act of March 3, 1883, c. 143, U. S. Statutes, XXII, p. 625, as amended by the Act of April 30, 1928, for the improvement in Electric Cryptographic Device (Signal Corps Case SC-E-Sp-1) set forth in the annexed Specification

And he hereby irrevocably give control of his application for Letters Patent to the Secretary of War, and appoint William D. Hall, whose post-office address is care of the Chief Signal Officer, Munitions Building, Washington, D C , attorney with full power of substitution and revocation to prosecute this application, to make alterations and amendments therein, to sign his name to the drawings, to receive the Letters Patent, and to transact all business in the United States Patent Office connected therewith.

Signed at Washington in the ~~County of~~ District of ~~and State of~~ Columbia this 6th day of December 1941

(Sign here,
(first name in full) William F. Friedman

SPECIFICATION

TO ALL WHOM IT MAY CONCERN

BE IT KNOWN, That William F. Friedman, a citizen of the United States residing at Washington in the ~~County of~~ District ~~and State~~ of Columbia have invented certain new and useful improvements in Electric Cryptographic Device of which the following is a specification

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

REF ID:A70340

LICENSE

WHEREAS,

William F. Friedman is an employee of the Government, and

WHEREAS, in pursuance of said employment the undersigned has invented certain improvements in

Electric Cryptographic Devices (Signal Corps Case SC-B-Sp-1)

for which the undersigned is about to make application for Letters Patent of the United States, and

WHEREAS, the nature of my employment, and the conditions and circumstances under which said invention was made, are such as to justly and lawfully entitle the Government of the United States of America to have a non-exclusive license and right to make and use said invention, together with any and all improvements thereon and inventions relating thereto that the undersigned has made or may hereafter make while employed and engaged by the United States Government,

NOW, THEREFORE, in consideration of the premises the undersigned does hereby give and grant unto the Government of the United States of America a non-exclusive license to make, to have made, to use and/or to sell, said invention as described in the specification executed by the undersigned on even date herewith, said non-exclusive license to extend to any and all Letters Patent which may be granted for said invention, (including all divisions, reissues, continuations, and extensions thereof) together with any and all improvements thereon and inventions relating thereto made by the undersigned while employed or engaged by the United States Government, or for which the undersigned may hereafter make application for Letters Patent while employed or engaged by the United States Government, reserving to the undersigned in each case the unrestricted possession of all other patent rights not hereby or otherwise licensed to the Government of the United States of America. Said license hereby granted or agreed to be granted shall extend throughout the United States, its territories and dependencies, and all foreign countries and shall continue in force for the full term for which said Letters Patent may be granted.

SIGNED at Washington, District of Columbia, this sixth day of December, 19 41

Witnesses.

P W Calbert

Hall

Signed

William F. Friedman

PETITION

TO THE HONORABLE COMMISSIONER OF PATENTS:

Your petitioner, WILLIAM F. FRIEDMAN, a citizen of the United States, residing at Washington, in the District of Columbia, whose post office address is 3932 Military Road, N. W., Washington, D. C., prays that Letters Patent may be granted him for the improvements in

ELECTRIC CRYPTOGRAPHIC DEVICE

set forth in the accompanying specification.

And he further prays that you will recognize I. RICHARD PARIS, Earle Building, Washington, D. C., Registration No. 11,653, as his attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

____

S P E C I F I C A T I O N

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT I, WILLIAM F. FRIEDMAN, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful improvements in ELECTRIC CRYPTOGRAPHIC DEVICE of which the following is a specification:

The present invention relates generally to a cryptographic device for enciphering and deciphering messages and, more particularly, to a simple and compact relatively small portable structure which is operated electrically by means of one or two customary dry cells embodied within the structure. It is the object of the present invention to provide a device of this type which may be operated rapidly, both for enciphering and deciphering messages merely by means of pressing keys or switch elements which are disposed immediately adjacent to illuminated elements bearing character indicia. Thus, in enciphering a message by means of the present device the operator merely depresses in succession the switch elements or operators which are disposed immediately adjacent the characters of the message, whereupon the corresponding cipher character is illuminated. Conversely, in deciphering a message the same process is followed in that the switch operators corresponding to the characters of the cipher message are successively depressed and the translated message character is illuminated.

Another object of the present invention is to provide an electrical cryptographic device of the type described in which the electrical system is simple and includes cipher wheels which may be set to any desired position in accordance with any system agreed upon between the communicating persons. It will be further understood that in the device shown herein the cipher wheels may be set in any predetermined manner before each message, and the setting may also, if desired, be varied in the enciphering and consequently the deciphering of the message.

The drawings accompanying the present application illustrate one specific embodiment of the present invention, it being understood, however, that variations of the embodiment falling within the scope of the appended claims will be apparent to persons skilled in the art.

In the drawings:

Fig. 1 is a plan view of the present device,

Fig. 2 is a vertical sectional view taken on line 2--2 of Fig. 1;

Fig. 3 is a fragmentary plan view taken on line 3--3 of Fig. 2;

Fig. 4 is a bottom view taken on line 4--4 of Fig. 2;

Fig. 5 is a perspective view of a structural detail; and

Fig. 6 is a diagrammatic showing of the electrical system employed in the present device;

Fig. 7 shows a modification of the cipher controlling device; and

Fig. 8 is a disassembled plan view of the device shown in Fig. 7.

The present device comprises a housing 10, preferably cylindrical in shape, provided interiorly thereof with a chamber 12 and a battery of dry cells 14 disposed within said chamber. The remainder of the structure in the present device constitutes a cover for the top of the housing 10, this cover also carrying all of the remaining operating elements which project into the interior of the housing 10, and comprises a plate 16 which is so designed and shaped that the peripheral portions thereof rest on the upper edges of the side walls of the housing 10, and a second plate 18 attached to and spaced from the lower face of the plate 16 by brackets 20, preferably of insulating material and so designed and shaped that it may enter freely into the interior of the housing 10, the other structural and operating elements being carried by the carrier plate 18, as shown, some of these elements being preferably disposed on the upper surface thereof and the remaining elements being properly attached to and suspended from the lower surface thereof.

The plate 18 carries on the upper face thereof a series of sockets 22 designed to receive electric bulbs 24. As shown the present device has thirty-four such sockets and bulbs or lamps, thus providing for the twenty-six letters of the alphabet and the digits 2 to 9, inclusive, the digit "1" being represented by the letter "I" and the zero being represented by the letter "O". It will be understood, however, that the number of such sockets and lamps and the number of characters may be varied as desired. These sockets are preferably disposed circularly near the upper edge of the plate 18, but this arrangement may be varied if desired.

Immediately adjacent each socket 22 the plate 18 also carries and preferably on the upper face thereof a two-position switch 26 in which the removable contact element 28 operates between the fixed contacts 30 and 32, removable elements 28 being preferably made of resilient metal and so designed that it normally maintains contact with the upper contact 30 but may be depressed into a position where it is out of engagement with the contact 30 and is in engagement with contact 32 by means of the operator 34 which may be made of insulating material and projects through a suitable aperture in plate 16 so that the same may be operated as desired. The plate 16 is provided with a series of openings 36 in registry with the lamps 24 and each of these windows is provided with a transparent closure 38 bearing the character indicia. The lower face of the plate 18 carries thereon a pair of annular metallic strips 40 and 42 which establish contact with the terminals of the battery of dry cells when the entire structure is properly assembled as shown in Fig. 2. The contact strip 40 is connected to each of the center contacts 44 of the sockets 22 by means of the screws 46. The annular contact 42 is connected to each of the stationary contacts 32, as shown.

The lower face of the plate 18 carries the bracket 48 and a contact plate 50 which is fixedly held against the brackets 48 by means of the screws 52. The plate 50 has a circular series of contacts 54 disposed on the face thereof away from the bracket 48, the number of such contacts corresponding to the number of lamps 24.

Connecting wires 56 lead from the contacts to the movable contact elements 28 of the switch 26. Another bracket 58 is carries by the lower face of the plate 18 and interposed between brackets 48 and 53 are interchangeable cipher wheels or commutators 60 and a return wheel or return commutator 62. The through commutators 60 have an annular series of contacts on each face corresponding in number to the number of lamps 24 and the contacts on one face are cross connected to the contacts on the other face thereof at random or in any desired arrangement. The return commutator 62, however, has only one set of contacts on one face thereof which are cross connected at random or in accordance with any desired arrangement. It will be understood that in the interchangeable commutators as well as in the return commutator each contact is connected to only one other contact.

The interchangeable commutator 60 and the end or return commutator 62 are carried by a shaft 64 and are rotatable thereon. One end of the shaft 64 is received in a center recess 66 on the face of the plate 50 while the other end of the shaft 64 is received in the aperture in the bracket 58, the latter being made of resilient metal so that when desired the shaft together with its commutators may be removed from engagement with the brackets 48 and 58 and the interchangeable commutators may be rearranged as desired. The commutators 60 and 62 rotate freely on the shaft 64 and are each provided with indicator lines 68 as shown, these lines being either numbered or lettered, as desired.

It will now be understood that the commutators 60 and 62 may be rotated to any desired position in accordance with a prearranged key, and that such position will determine enciphering and deciphering of a message. If an apparatus of this type is in the hands of persons who wish to communicate secretly with each other and if the commutators in the two apparatus are the same and are set to the same key position, messages may be enciphered and deciphered rapidly merely by the successive depression of the keys or operators 34, the translation being indicated by the illuminated windows 38.

The operation of the system will now be understood, and by reference to the diagrammatic showing in Fig. 6 it will be seen that in the normal position the contacts 28 are in engagement with the upper contacts 38 and none of the lamps 34 are illuminated. When it is desired to encipher a message the keys 34 are depressed successively and at each depression the corresponding movable contact element 28 is moved from engagement with its upper contact 30 into engagement with the lower contact 32. Assuming that the character being coded is the letter "A", a circuit is established from the battery 14 through the annular contact 42 through the closed contacts 32 and 28, wire 56, through a contact on plate 50, through the cross connections in the interchangeable commutators 60 leading to a contact on the face of the return commutator 62 and back again to another contact on the face of the return contact 62 and then through the interchangeable commutator 60 and back to still another contact on the face of the plate 50, and then by means of another wire 56 to the contact 28 of lamp "B" through lamp "B" to the annular contact 40 and back to the battery 14.

Thus, the present device indicates that the letter "A" is translated into cipher by means of the letter "B" in decoding. When the apparatus used for decoding contains the same commutators and in the same arrangement the switch 28 corresponding to the letter "B" is depressed by means of the corresponding operator 34 and a similar circuit will be seen to be established which incluces the lamp "A", thereby indicating that the translated character corresponding to the cipher "B" is the letter "A".

It will now be understood that the device shown herein is simple in construction, may be operated with great facility, and that it permits a great variation in the cipher code within very wide limits.

Figs. 7 and 8 show a modified construction which differs from that shown and described heretofore by the substitution of straight bars 70 and 71 for the circular elements 59 and 62, respectively and inserting a slidably removable bar 72 between the bars 70 and 71, the bar 72 serving in lieu of the cipher wheels 60.

The elements 70 and 71 are mounted on the lower face of the plate 18, as shown, and are each provided with a longitudinal flange 73, forming together a guide way cooperating with the longitudinal channels 74 in the sides of the slidable bar 72.

The bar 70 has a series of contacts 75 on its inner face, the wires 56 being connected to these contacts. The contacts 76 on the inner face of the end bar 71 are cross connected as shown by lines 77 to return the circuit through the bar 72 and back through another wire 56.

The bar 72 has a set of contacts 78 and 79 on each lateral face cooperating with the contacts 75 and 76, respectively. The contacts 78 and 79 are cross connected at random, each contact or one face being connected to only one contact on the other face. These connections may be made interiorly of the bar 72 during its manufacture. A plurality of such bars, each bearing identification data would be supplied to the operator, and in use, persons communicating with each other would use bars 72 having the same connections as indicated by the identification data on the bar.

In order to give the operators great freedom in varying the cipher from time to time, the bar 72 shown has a jack 80 associated with each contact 78 and a jack 81 associated with each contact 79. Cords 82 having a plug 83 at each end are then employed for establishing any desired cross connection between the contacts 78 and 79. Thus persons in communication with each other may establish their own cipher and may change them from time to time, as desired.

Having thus described my invention, I claim:

1. An electric ciphering device comprising a source of voltage, a plurality of parallel circuits connected to said source, each of said circuits comprising an electrical character indicator and a movable switch element normally in electrical contact with one side of said indicator and movable to open said contact and close contact with the source, and additional circuit means electrically interposed between pairs of said switch elements, thereby establishing reciprocal character and cipher relationships between the corresponding pairs of indicators.

2. An electric ciphering device comprising a source of voltage, a plurality of parallel circuits connected to said source, each of said circuits comprising an electrical character indicator and a movable switch element normally in electrical contact with one side of said indicator and movable to open said contact and close contact with the source, and additional circuit means electrically interposed between pairs of said switch elements, thereby establishing reciprocal character and cipher relationships between the corresponding pairs of indicators, said additional circuit means having adjustable devices for changing the pairing of said indicators.

3. An electric ciphering device comprising a plate, a set of electric character indicators carried by the plate, a double throw switch carried by the plate immediately adjacent each of said indicators, each switch comprising a pair of spaced fixed contacts and a movable contact operable therebetween, one of said fixed contacts being electrically connected with its indicator, the movable contact being normally biased into contact with said one fixed contact, a conductor connecting all of the other fixed contacts, another conductor connecting the other terminal of said

indicator, a voltage source connected to said conductors, and wiring means electrically interposed between pairs of said movable contacts establishing reciprocal character and cipher relationships between the corresponding pairs of indicators.

4. An electric ciphering device comprising a plate, a set of electric character indicators carried by the plate, a double throw switch carried by the plate immediately adjacent each of said indicators, each switch comprising a pair of spaced fixed contacts and a movable contact operable therebetween, one of said fixed contacts being electrically connected with its indicator, the movable contact being normally biased into contact with said one fixed contact, a conductor connecting all of the other fixed contacts, another conductor connecting the other terminal of said indicator, a voltage source connecting to said conductors, and wiring means electrically interposed between pairs of said movable contacts establishing reciprocal character and cipher relationships between the corresponding pairs of indicators, said wiring means having adjustable devices for changing the pairs of said indicators.

5. An electric ciphering device comprising a plate bearing a set of character indicia on a face thereof, an electric lamp disposed immediately adjacent each character, a manually operable switch adjacent each character, and circuit means and devices whereby the operation of a switch corresponding to a selected character will illuminate one of said characters to indicate a cipher symbol therefor.

6. An electric ciphering device comprising a plate bearing a set of character indicia on a face thereof, an electric lamp disposed immediately adjacent each character, a manually operable switch adjacent each character, and circuit means and devices whereby the operation of a switch corresponding to a selected character will illuminate one of said characters to indicate a cipher symbol therefor, said devices including means for varying the cipher code.

7. An electric ciphering device comprising a set of electrically operable character indicators serving both as message characters and as cipher symbols, a switch associated with each indicator, and a wiring system for said indicators and switches providing an electrical path for each indicator which also includes the switch associated with another indicator whereby the two indicators thus associated have a character and cipher relationship and the operation of the switch of one operates the other indicator.

8. An electric ciphering device comprising a set of electrically operable character indicators serving both as message characters and as cipher symbols, a switch associated with each indicator, and a wiring system for said indicators and switches providing an electrical path for each indicator which also includes the switch associated with another indicator whereby the two indicators thus associated have a character and cipher relationship and the operation of the switch of one operates the other indicator, said wiring system including a variably adjustable device for altering said paths.

9. An electric ciphering device comprising a pair of spaced plates, a set of electric lamps carried by the lower plate, a double throw switch carried by said lower plate immediately adjacent each of said lamps, and an operator therefor, each switch comprising a pair of spaced fixed contacts and a movable contact operable therebetween, one of said fixed contacts being electrically connected with its lamp, the movable contact being normally biased into contact with said one fixed contact, a conductor connecting all of the other fixed contacts, another conductor connecting the other terminal of said lamps, the upper plate having a window in registry with each of said lamps, each window bearing a character indicator, said upper plate also having a passage adjacent each window receiving the switch operator, and a wiring system providing variable electrical paths through each lamp controlled by a switch associated with another lamp.

10. An electric ciphering device comprising a pair of spaced plates, a set of electric lamps carried by the lower plate, a double throw switch carried by said lower plate immediately adjacent each of said lamps and an operator therefor, each switch comprising a pair of spaced fixed contacts and a movable contact operable therebetween, one of said fixed contacts being electrically connected with its lamp, the movable contact being normally biased into contact with said one fixed contact, a conductor connecting all of the other fixed contacts, another conductor connecting the other terminal of said lamps, the upper plate having a window in registry with each of said lamps, each window bearing a character indicator, said upper plate also having a passage adjacent each window receiving the switch operator, and a wiring system providing an electrical path through each lamp operable by the switch of another lamp and including variably adjustable devices for altering said paths.

11. An electric ciphering device comprising a pair of spaced plates, a set of electric lamp sockets carried by the lower plate, a double throw switch carried by said lower plate immediately adjacent each of said sockets and an operator therefor each switch comprising a pair of spaced fixed contacts and a movable contact operable therebetween, one of said fixed contacts being electrically connected with its socket, the movable contact being normally biased into contact with said one fixed contact, a conductor connecting all of the other fixed contacts, another conductor connecting the other terminal of said sockets, means connecting a source of current to said conductor, the upper plate having a window in registry with each of said sockets, each window bearing a character indicator, said upper plate also having a passage adjacent each window receiving the switch operator, said lower plate also carrying on its lower face a fixed contact plate having an annular series of contacts the same in number as the number of characters, conductors connecting said contacts with the movable switch elements, a rotatable return commutator wheel having the same number of contacts connected in pairs, and one or more rotatable cipher code wheels interposed between said contact plate and said return commutator wheel.

12. An electric ciphering device comprising a set of electrically operable character indicators serving both as message characters and as cipher symbols, a switch associated with each indicator, and a wiring system for said indicators and switches providing an electrical path for each indicator which also includes the switch associated with another indicator whereby the two indicators thus associated have a character and cipher relationship and the operation of the switch of one operates the other indicator, the said wiring system including a pair of spaced bars and a slidably removable commutator bar disposed between said spaced bars, the adjacent faces of said bars each having a set of contacts corresponding in number to the indicators.

IN WITNESS WHEREOF, I have signed my name to the foregoing specification.

DISTRICT of COLUMBIA } ss:

WILLIAM F. FRIEDMAN, the above named petitioner, being duly sworn, deposes and says that he is a citizen of the United States, and a resident of Washington, in the District of Columbia, that he verily believes himself to be the first, original, and sole inventor of the improvements in

ELECTRIC CRYPTOGRAPHIC DEVICE

described and claimed in the annexed specification, that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, or more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application, that said invention has not been patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months prior to this application, and that no application for patent on said improvements has been filed by him or his representatives or assigns in any country foreign to the United States.

Subscribed and sworn to before me this day of , 1937.

Notary Public.

I RICHARD PARIS
PATENT LAWYER
EARLE BUILDING
WASHINGTON D C

FIG. 1.

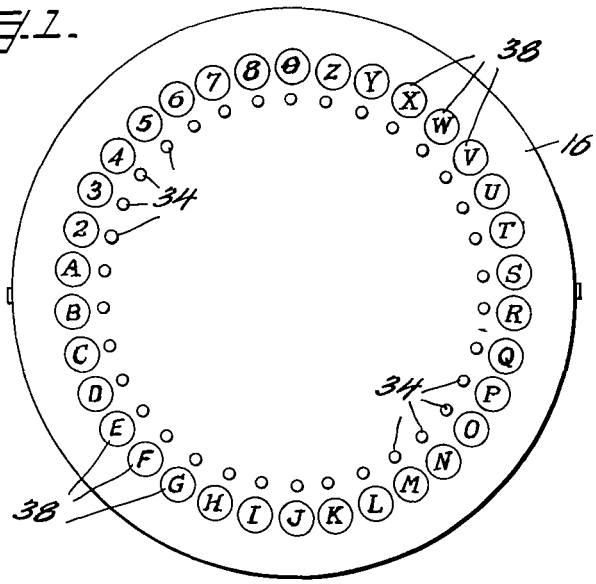


FIG. 2.

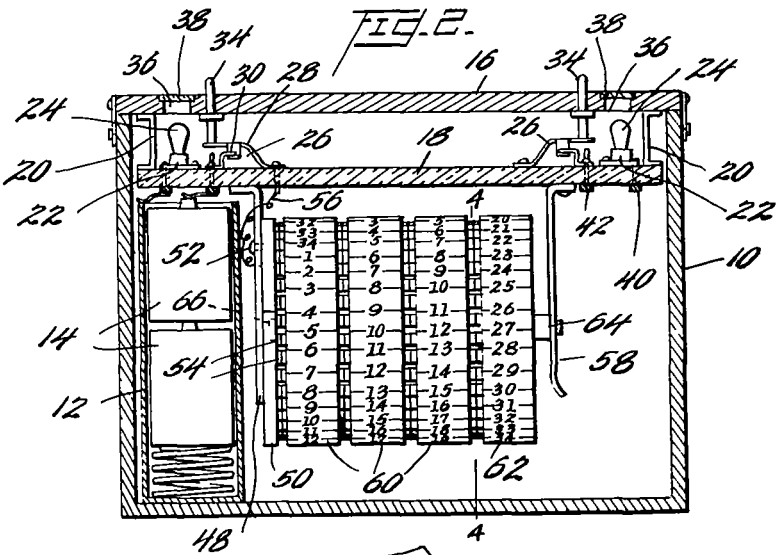
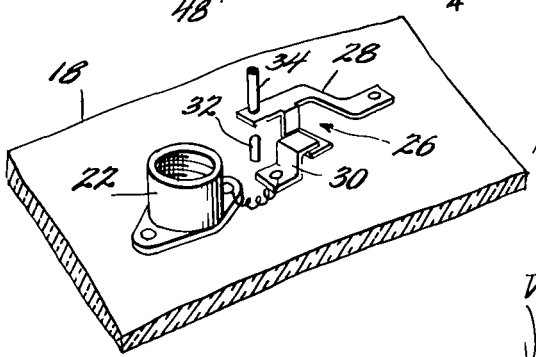


FIG. 5.



Inventor

William F. Friedman,

By J R Paris

Attorney

I RICHARD PARIS
PATENT LAWYER
EARLE BUILDING
WASHINGTON D C

FIG. 3.

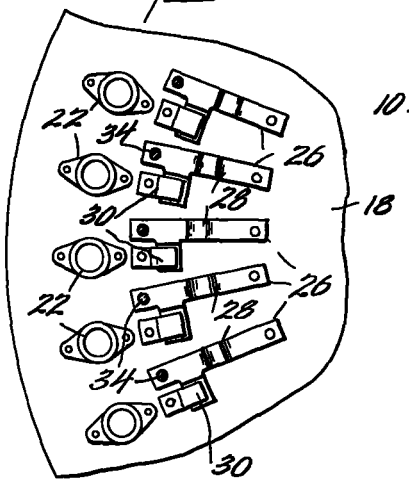


FIG. 4.

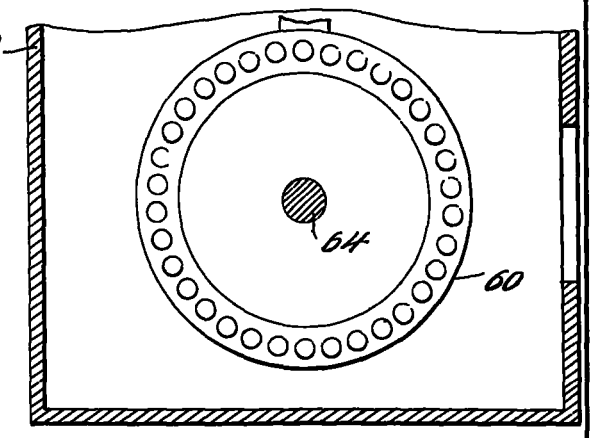


FIG. 6.

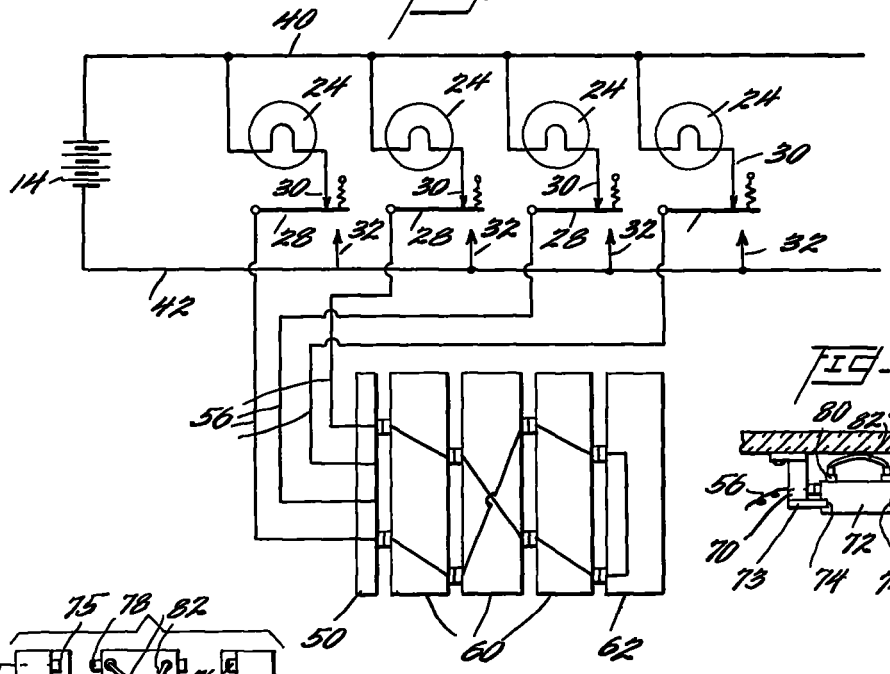


FIG. 7.

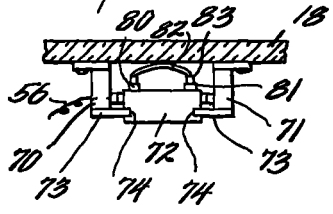
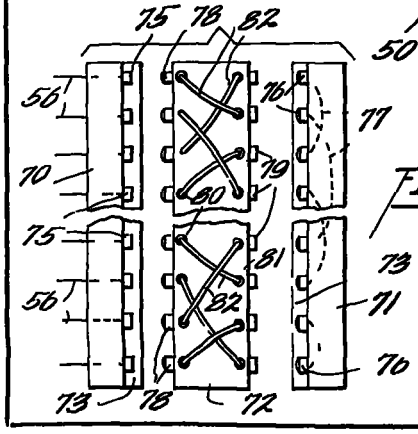


FIG. 8.



Inventor

William F. Freeman,

By I R Paris

Atty

REF ID:A70340

I RICHARD PARIS
PATENT LAWYER
EARLE BUILDING
WASHINGTON D C

FIG. 3.

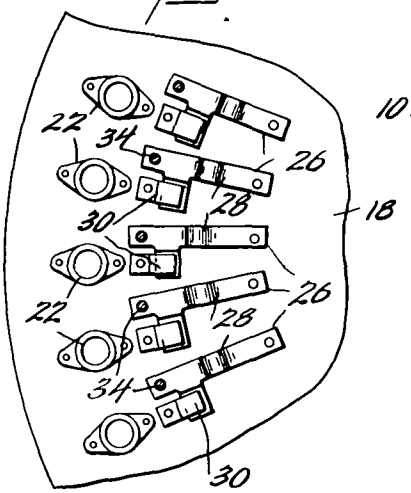


FIG. 4.

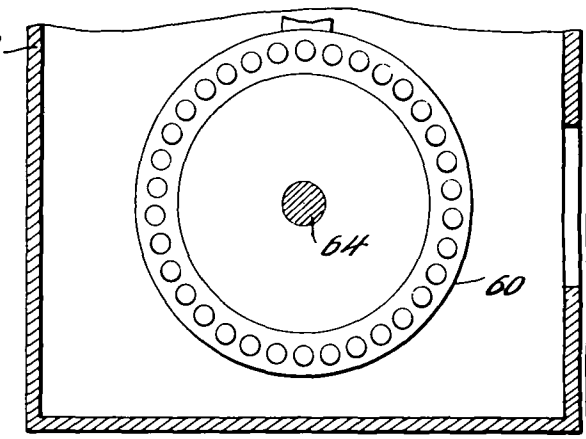
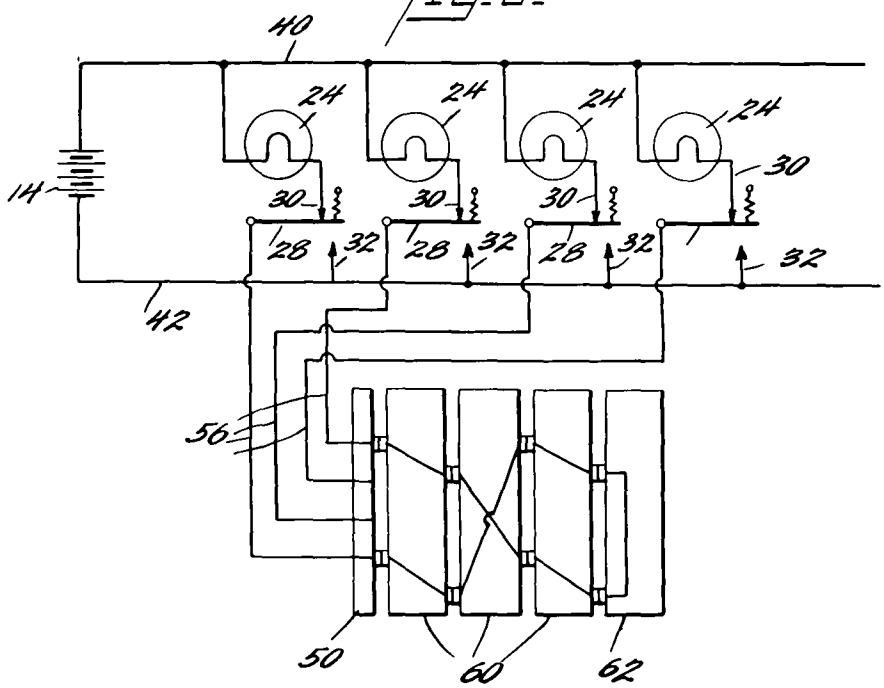


FIG. 6.



Inventor
William F. Friedman,
By J R Paris
Atto nay

IN REPLY
REFER TO
OCSigC-070

10.

WAR DEPARTMENT
OFFICE OF THE CHIEF SIGNAL OFFICER
WASHINGTON

June 16, 1936.

MEMORANDUM TO: Mr. Friedman,
War Plans and Training Division.

1. In answer to your verbal request, you are informed that there is no objection to the sale of your rights under the patent application for "Stylus-Operated Keyboard for a Small Portable Cryptograph" or disclosure of the principles set forth in that patent application.

By Order of the Chief Signal Officer:

Roger B. Colton,
Lieut. Col., Signal Corps.

S 15 DE-24

SIGNAL CORPS PATENT BOARD

MEETING NO. 3 May 26, 1936.

1. a. The Board met at 2 P M this date, in room 3435, Munitions Building, Present. All members.

b. Mr. W. F. Friedman was called as a witness.

2. The purpose of this meeting was to take action and make recommendations with reference to the following inventions of Mr. W. F. Friedman.

a Indicating Device - Invented March 20, 1936.

b. Improvement in Converter type M-134-T1 - Invented March 11, 1936.

c. Stylus-operated Keyboard for a small Portable Cryptograph - Invented August 1, 1935.

3. a. The Board finds that the Indicating Device described in a drawing and attached paper, dated March 20, 1936, has no value to the Government.

b. The Board recommends that the invention covering the Indicating Device be returned to Mr. Friedman with a statement to the effect that such device has no military value, and that there is no objection to his applying for letters patent on this device, if such application is prosecuted without expense to the Government.

4. a. The Board finds that the Improvement in Converter M-134-T-1 as described in memorandum of April 29, 1936, is of value to the Government.

b. (1) The Board recommends that Mr. Friedman be instructed to submit specifications to the Patent Section for the necessary action with a view to obtaining letters patent under the provision of Section 4886 of the Revised Statutes.

(2) The Board recommends that the invention be not considered important in the National Defense, and that a non-exclusive license to the Government, in writing, be required.

5. a. The Board finds that the "Stylus-operated Keyboard for a small Portable Cryptograph" as described on photostatic copy of drawing dated August 1, 1935, and attached description of Device dated April 21, 1935, is of value to the Government

b. The Board recommends that.

(1) Mr. Friedman be instructed to submit specifications to the Patent Section for the necessary action, with a view to obtaining letters patent under the provisions of Section 4886 of the Revised Statutes.

(2) The invention be not considered important in the National Defense, and that a non-exclusive license to the Government, in writing, be required.

Roger B. Colton,
Lieut. Col., Signal Corps,
President.

George I. Back,
Captain, Signal Corps,
Member.

W. S. Rumbough,
Major, Signal Corps,
Member.

Walter C. Ellis,
Major, Signal Corps,
Recorder.

APPROVED.

J. B. Allison,
Major General,
Chief Signal Officer of the Army.

6

April 22, 1936

MEMORANDUM FOR: Research & Development Division
("HFU: War Plans & Training Division)

There is attached hereto a drawing and explanation of an invention of a stylus-operated keyboard for a small portable cryptograph. It is desired to obtain a patent on this invention.

William F. Friedman.

Attached:
Drawing and description.

For action of Patent Board
See Minutes of Meeting No 3.

COPY FOR MR. FRIEDMAN

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Invention of a Stylus-operated Keyboard for a Small Portable Cryptograph

1. The keyboard of this cryptograph consists of a plate having 26 small windows underneath which are small lamps. The windows are arranged in three rows and on them are painted the letters of the alphabet, distributed as on a standard typewriter keyboard. Alongside each window is an aperature through which a non-conducting stylus may be inserted to operate a contact lever below.

2. The circuits are reciprocal and one pair of such circuits is shown in operative association in the accompanying Figure 1, viz., the circuits for the A = Q, Q = A relationship. This is accomplished by means of the usual "return" commutator (as per Enigma system).

3. The drawing shows a set of three cipher commutators, two of which are of the ordinary "through" type, one of the "return" type, but additional commutators of the "through" type may be employed. "Through" commutators are all interchangeable.

4. Means are provided for advancing the commutators for cryptographic variation, either a meterlike, or aperiodic movement being available according to schemes not forming a part of this invention. Probably a hand-operated power source for angularly displacing the commutators would be practicable in such a device, the particular selection being determined by cams, tapes, or the like.

William F. Friedman

William F. Friedman.

Attached:
Fig. 1

Conceived on Aug 1, 1935 and a rough sketch made. The attached sketch and this description were made on April 24, 1936. W.F.F.

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Conceived on Aug 1, 1935 and a rough sketch made. The attached sketch and this description were made on April 21, 1936

W.F.F.

~~CONFIDENTIAL~~

Disclosed to me on or about August 1935

Jack B Rowlett
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Invented Aug 1, 1935
William F Friedman

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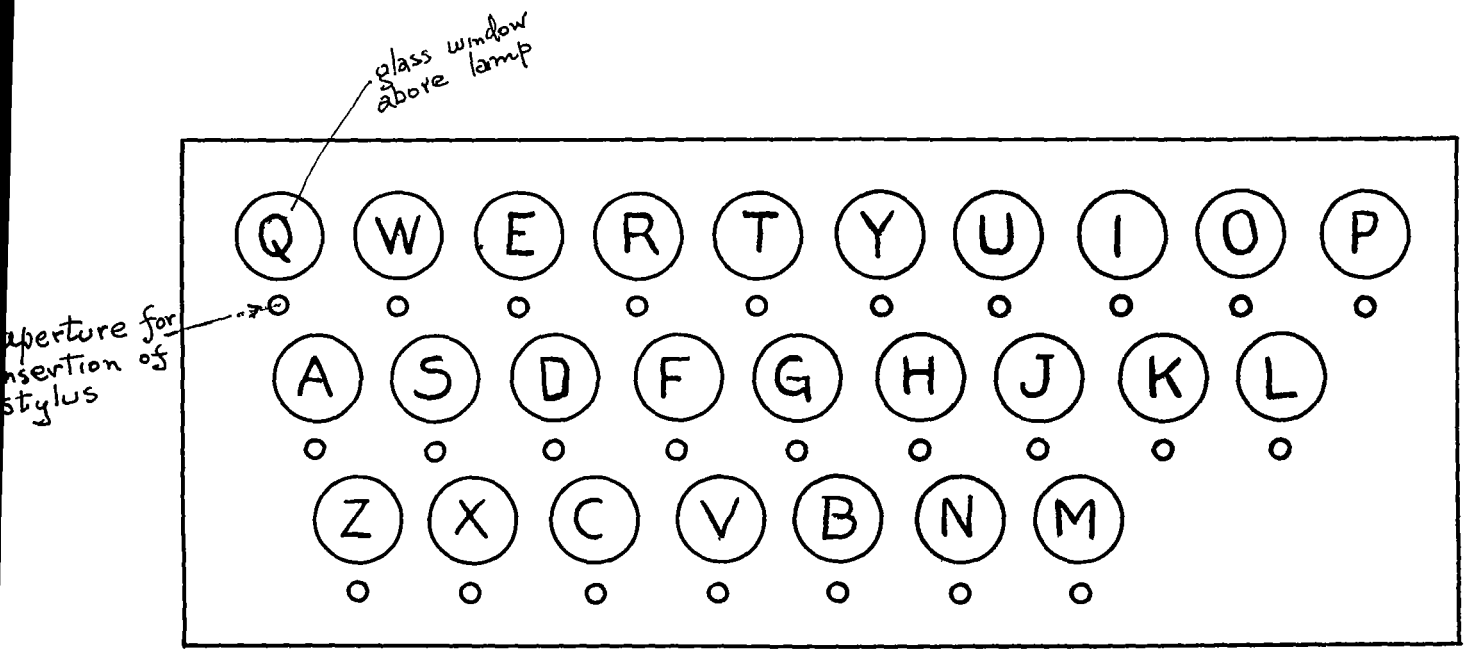

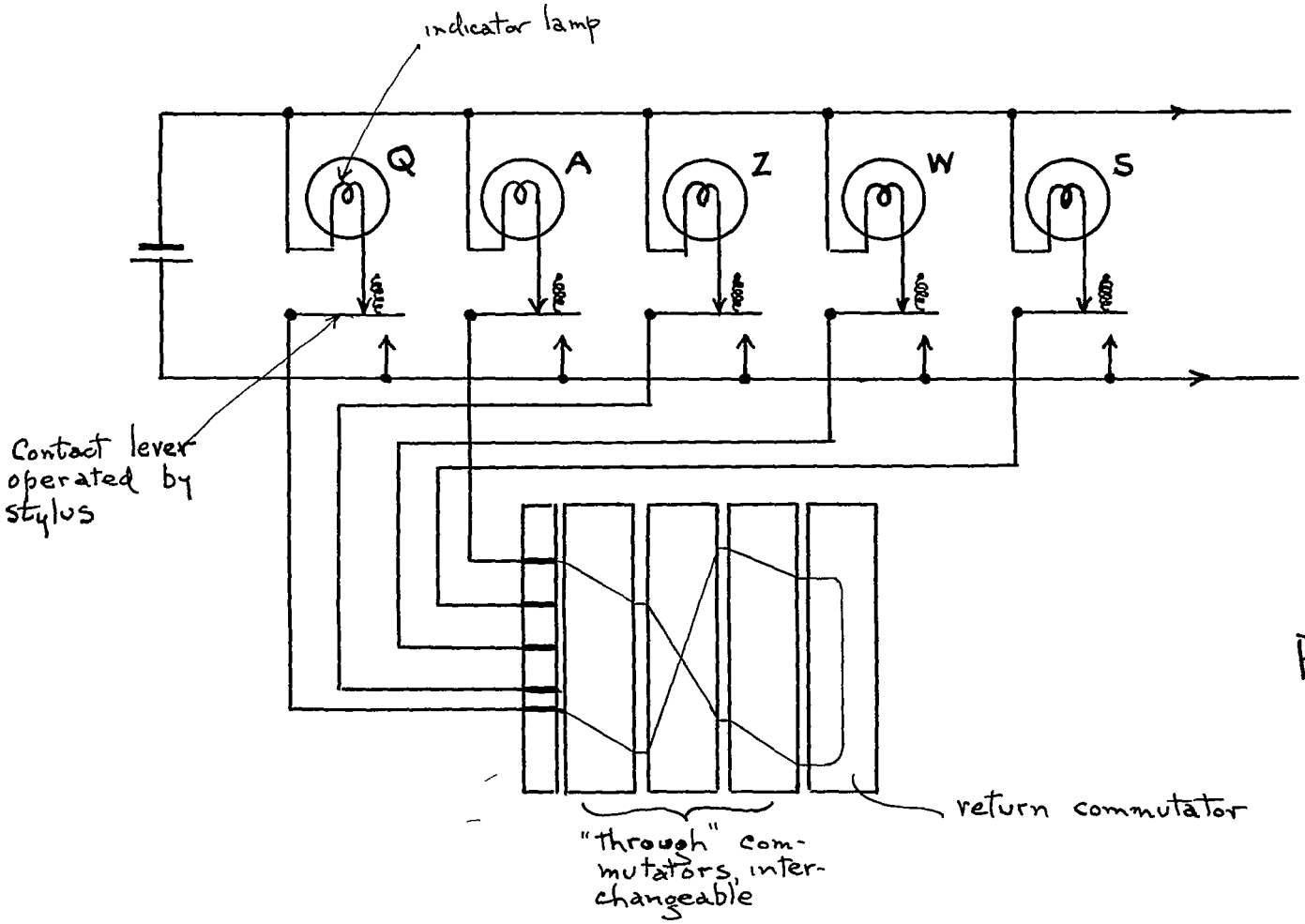

Fig 1

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Invention of a Stylus-operated Keyboard for a Small Portable Cryptograph

1. The keyboard of this cryptograph has its letters arranged as on the standard typewriter keyboard, but the keyboard does not have keys, these being replaced by apertures through which a non-conducting stylus is inserted to operate the circuit concerned

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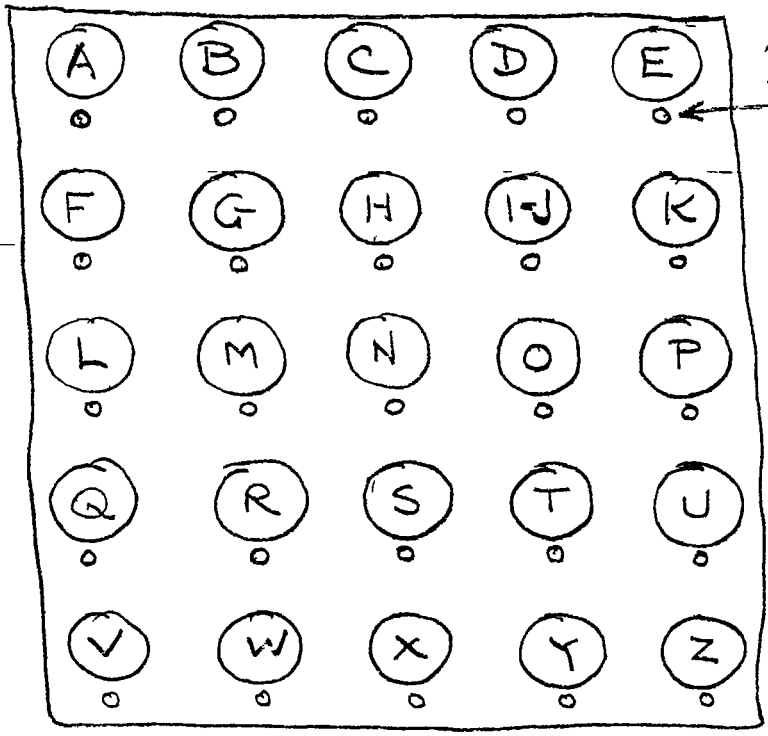
Attached:
Fig. 1

W. F. F.

New type of "Keyboard" to be operated by using a stylus in holes to operate contacts



about Aug 1, 1935
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