

SIGLG-3-HMS

1 October 1947

Request for Clearance

Judge Advocate General, Washington, D. C.
Attn: Chief, Patents Division

1. Clearance is requested to investigate and make any necessary settlements in connection with the claim of Edward H. Hebern and Hebern Code, Inc., involving question of infringement of United States Patents No. 1,683,072, No. 1,861,857, No. 2,267,196, No. 2,269,341, and No. 2,373,890.

2. In letter addressed to the Secretary of Defense; Secretary, Department of the Army; Secretary, Department of the Air Force; and Secretary, Department of the Navy, dated 3 September 1947, claims for an amount in excess of \$50,000,000 are set forth on the basis of alleged use of subject patented inventions in cryptographic devices by the Government.

3. In compliance with the provisions of PR 1115.6, the following information is submitted:

a. Name and address of claimant:

Edward H. Hebern
485 40th Street
Oakland, California
and
Hebern Code, Inc.
139 North Virginia Street
Reno, Nevada

c/o Barnard & Henry
Suite 300 Kellogg Building
1422 F Street, N. W.
Washington, 4, D. C.

b. Name and address of contractors alleged to have performed infringing acts:

None alleged by claimant.

c. Number of patents concerned:

1,683,072 granted 4 September 1928
1,861,857 granted 7 June 1932
2,267,196 granted 23 December 1941
2,269,341 granted 6 January 1942
2,373,890 granted 17 April 1945

d. Description of alleged infringing subject matter:

Cryptographic Devices.

4. A copy of letter dated 3 September 1947 is inclosed herewith.

FOR THE CHIEF SIGNAL OFFICER:

1 Incl.
Cy ltr 3 Sept 47

JOHN E. FERNICE
Chief, Legal Division

A Radio Code With Eleven Million Variations

By S. R. WINTERS

WHEN the battleship fleets of the Atlantic and Pacific engaged in maneuvers in the vicinity of the Panama Canal, in March, there was in operation for the first time under service conditions an apparatus for transmitting radiotelegraph messages in a code capable of 11,881,376 variations. The invention, the work of Edward H. Hebern of Oakland, California, is said to be the only one in the world by which wireless communications can be sent by a code system that is automatically deciphered and is clothed in absolute secrecy. A reward of \$5,000, offered to the Department of Justice many months ago, contingent upon its ability to decipher a message thus transmitted, has not been redeemed.

This machine, for which more than seventy patents have been issued or are pending in all countries of the world, functions in conjunction with a small, changeable wheel known as the "key wheel" or "code wheel." A statistical wizard in California has computed the possible changes to which one code wheel is subject as approaching the staggering figures—40,303,146,321,064,147,046,400,000. Be that as it may, this tiny wheel, weighing barely twelve ounces, contains a multiplicity of abbreviated electric wires—twenty-six, to be exact. In either side of this wheel are also twenty-six apertures, with an equal number in the rim.

Each key on the typewriter-like keyboard is wired in combination with other letters and they are responsive to a slight pressure of any of the letter keys, each of the latter being energized by an electro-magnet. The entire apparatus is electrically operated, the arrangement of the complicated wiring containing the secret of the instrument. A dry battery, half the size of one's hand, is sufficient to operate the machine for about two hours. The model on demonstration in Washington, D. C., employs a No. 750 Tungsten battery. As a matter of fact, any source of electricity is capable of operating this mechanism—a six-

volt automobile battery, dry cells, or direct or alternating current from a 110-volt home or office circuit. The standard code machine, however, is equipped for operation with alternating current, contact being made with a 110-volt circuit, which is "stepped down" to twenty volts by a transformer within the stand of the apparatus. If direct current is to be used, a special transformer is supplied for reducing the strength of the electric energy.

The operator who desires to transmit wireless messages according to this code system writes what he has to say in plain English on the keyboard. The code wheel on the sending device transforms the words into a jumble of letters, so to speak, for conveyance through the ether by radio. Both the sending and receiving units of this machine are combined, the entire outfit weighing barely twenty-five pounds and being less bulky than a typewriter.

The unit for the reception of the radiotelegraph communications records the words in code just as they were sent. However, the message is mechanically decoded before it is actually put down on paper by the receiving operator, who manipulates a keyboard according to the letters spelled out on an electrically-illuminated alphabet-board identical in arrangement with his keyboard. For the sake of convenience in transmission and as an extra precaution for insuring secrecy, the sending mechanism automatically prints the code in groups of five letters, and the decoding unit, at the wireless receiving station, converts these five-letter groups back into understandable English words.

The operator of the code receiving unit maintains on a rack in front of him a number of these spools or code wheels which correspond in wiring to similar wheels at the transmitting point. The operator who is to decode the message needs to know on which key letter the opposite wheel was set in order that he may set his wheel at the same key letter to start decoding. This is necessary since a wheel set at any one of the twenty-six key letters causes

the machine to write an entirely different code. Therefore, it is important either to print the key letter on which a code wheel starts coding as the first letter of the message, or to have it understood in advance what key letter will be used. Differently expressed, letters common to two wheels are first sent, which affords a "key" to the receiving operator to insert into his machine the similarly electrically-wired code wheel from his rack. That is, only two wheels that have electric wiring in common will function together.

The so-called "Hebern Electric-Super Code," to quote the inventor, "is merely the application of the electric current in certain combinations, which causes the machine at the receiving end to reproduce in understandable words an apparently meaningless, yet systematic, jumble of words sent out by the operator of the sending machine. Neither the sending nor the receiving operator knows the letters that are going through the air; that is the secret of the machine, or rather the secret of the two little, electrically synchronized wheels, a dozen of which can be carried in a man's coat pocket. The machine without the wheel is useless; the wheel without the machine is nothing but a little metal bobbin.

"To solve any one message sent out between any two of these machines and plucked from the air by wireless instruments, would require exactly 11,881,376 experiments, and it would require all the time of a staff of code experts for 100 years to make these experiments."

The "Hebern Electric-Super Code" is built in two units, one design being applicable to the service of the United States Government in times of war or peace, and the other provided with a typewriter and adaptable to commercial purposes. It is understood that the inventor will not sell these machines, but will lease them to interested parties. The machine is only

about 8 by 10 inches in dimensions and may be carried from place to place in a small case.

The protection of documents issued by banks, such as travelers' checks, drafts, cashiers' checks; the transmission of important business papers between banks or other commercial firms, and as a means of preventing forgery, are among the suggestions advanced for the application of this wonder-working mechanism to peace times. Somebody has stated that code messages sent during the Civil War have not yet been deciphered. Even as late as the World War the imperfection of code systems was realized when during the naval engagement off Jutland the code system was abandoned after a trial of one hour and messages received during that brief sixty minutes were not deciphered for days thereafter. The use of radio and the invention here described may solve the problem of the United States in the event of future wars, when a secret and yet readily understandable code system is a pressing need.



THE HEBERN ELECTRIC-SUPER CODE MACHINE

Improvements in Automatic Cipher Printing and Transposing Apparatus.

interference by noise with the receipt of wireless messages, this printing apparatus is situated outside the silent room and is actuated electromagnetically like the other sets of type bars, the tape upon which the message is printed being exposed at a window in the silent room within the view of the operator; and there is the further advantage in this arrangement that it does not involve the use within the silent room of a set of key levers of considerable range of movement and requiring the exercise of an appreciable force to actuate them, but only a set of Morse or other suitable electric contact keys which require only the lightest touch for their operation.

It will be readily understood that instead of manually changing the interconnections between the two sets of electromagnets for printing in cipher and *en clair* respectively, each current established upon depressing a key may be arranged to actuate a ratchet and pawl device by means of an electromagnet so as to change the interconnections and therefore the cipher one step at each letter or symbol printed; or alternatively instead of changing the cipher at each symbol, it may be arranged to be changed after the printing of each group of five or other number of letters or symbols.

It will be obvious that, except for the purpose of converting into cipher as well as deciphering, the second set of keys is not necessary and may be dispensed with, but in the complete apparatus as hereinbefore described two sets of Morse keys would be provided, the working stops of all the keys being connected with one pole of a battery or other suitable source of current, and the back stops with the other pole thereof, while the individual key levers themselves are connected with the individual magnets of the two groups of electromagnets and these individual magnets are connected with each other through a suitable commutator.

Dated this 14th day of July, 1913.

ABEL & IMRAY,
Agents for the Applicant,
29, Southampton Buildings, W.C.

COMPLETE SPECIFICATION

Improvements in Automatic Cipher Printing and Transposing Apparatus.

I, Admiral Sir PERCY MORETON SCOTT, Bart, K.C.B., of 52, South Audley Street, London, S.W., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement.—

This invention relates to apparatus for ciphering and deciphering messages or signals, and is designed primarily as an accessory to wireless signalling installations in which messages may be received either in cipher or *en clair*, the apparatus enabling the operator in the receiving or silent room of the wireless installation to print the message as it is received by means of an apparatus which is suitably enclosed or is situated at any convenient place outside the silent room so as not to interfere with the receipt of the message. While this, however, is the primary object of the invention, it will be obvious that the apparatus can be used otherwise than in association with wireless installations, although the invention will be hereinafter described mainly with reference to such an application.

The apparatus comprises two series of keys one of which is used for the printing of a message received in cipher and the other for converting an

Improvements in Automatic Cipher Printing and Transposing Apparatus.

en clair message into a cipher message. Each of these keys controls an electric circuit which includes an electromagnet operating a definite type bar, one set of keys being associated with one set of electromagnets and type bars, and the other set of keys with a similar set of electromagnets and type bars, and between the two sets of electromagnets there is interposed a commutator by means of which the interconnections of the electric circuits of the two sets can be changed either by hand, as and when desired, or automatically by currents established upon manipulation of the keys. The arrangement of the electric circuits is such that when any key (say of the cipher printing keyboard) is depressed, a current is established which energises one of the set of electromagnets directly associated with this keyboard and also one of the other set of electromagnets so that two type bars are actuated, one printing the letter or other symbol as received, and the other the corresponding deciphered letter or symbol. The two sets of type bars are so disposed that the two letters or symbols are printed simultaneously (the one in cipher and the other *en clair*) upon the same strip, so that when a message received in cipher is printed by the apparatus both the message as received and the deciphered message will appear upon this strip.

Should the message be received *en clair* it will appear upon the tape *en clair* and alongside it a meaningless or dummy cipher message.

In addition to this apparatus a printing apparatus may be provided which simultaneously prints the message transmitted by the operator in a position in which the message can be seen by the operator. For example, the key levers may be arranged to actuate mechanically a set of type bars like an ordinary typewriting apparatus; but preferably, in order that there should be no interference by noise with the receipt of wireless messages, this printing apparatus is situated outside the silent room and is actuated electromagnetically like the other sets of type bars, the tape upon which the message is printed being exposed at a window in the silent room within the view of the operator, and there is the further advantage in this arrangement that it does not involve the use within the silent room of a set of key levers of considerable range of movement and requiring the exercise of an appreciable force to actuate them, but only a set of Morse or other suitable electric contact keys which require only the lightest touch for their operation.

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It will be obvious that, except for the purpose of converting into cipher as well as deciphering, the second set of keys is not necessary and may be dispensed with, but in the complete apparatus as hereinbefore described two sets of Morse keys would be provided, the working stops of all the keys being connected with one pole of a battery or other suitable source of current, and the back stops with the other pole thereof, while the individual key levers themselves are connected with the individual magnets of the two groups of electromagnets and these individual magnets are connected with each other through a suitable commutator.

The invention is illustrated in the accompanying drawings with reference to a deciphering apparatus, the second set of keys hereinbefore referred to being therefore dispensed with. In these drawings Fig. 1 is a section of the keyboard and commutator box, Fig. 2 is a plan view of the same with part of the keyboard and cover removed, Fig. 3 a part plan of the printing apparatus, Fig. 4 a section on line 4—4 of Fig. 3, Fig. 5 a section on line 5—5 of Fig. 3 shewing the spacer and inking ribbon feed mechanism; and Figs. 6 and 7

Improvements in Automatic Cipher Printing and Transposing Apparatus.

are diagrams shewing the electrical connections of two arrangements of apparatus contemplated in the present invention

As a message is received, the operator depresses the key 1 corresponding with each character or symbol as received and by so doing completes an electric circuit which includes one or other of the series of electromagnets marked 2 in Fig. 3 and also one or other of the series of the electromagnets marked 3 in Fig. 3. The magnets 2 and 3 are connected through the medium of the commutator drum 4 and contact springs 5 in such a manner that, by rotation of the commutator, any one of the magnets 2 can be connected in series with any one of the magnets 3. The magnets 2 are adapted, when energised, to actuate a corresponding set of type bars 2^a, and the magnets 3 a similar set of type bars 3^a, the two sets of magnets and then associated type bars being disposed as shewn in Fig. 3, around an approximately semi-circular arc, the intervening space between the two sets being occupied by the tape and associated mechanism. Consequently with any pre-arranged relation of the interconnections between the magnets 2 and the magnets 3, which relation may be conveniently indicated by the particular numeral on the commutator drum 4 which is exposed through an inspectional aperture 6^a in the casing 6, the depression of any given key 1 will actuate two definite type bars, one in each of the two groups 2^a, 3^a so that if a message is received and is printed in cipher by the typing bars 2^a, it is simultaneously printed *en clair* by the type bars 3^a when the commutator 4 has been properly set.

In addition to the circuit of the type bar magnets being completed upon depressing one of the keys, the circuit of another electromagnet 7 which actuates the feeding mechanism of the tape 8 and also the feeding mechanism of the inking ribbon 9 is also closed, with the result that the armature 7^a of this magnet is attracted and causes a pawl 10^a carried upon it to pass over one tooth of the ratchet wheel 10, and consequently upon the key being raised and the several magnets de-energised the armature 7^a is retracted by the action of the spring 7^b and the ratchet wheel 10 is turned through an angle corresponding to one tooth by means of the pawl 10^a. The ratchet wheel 10 is carried by a feed wheel 11 having knurled edges between which and the knurled edges of the spring-urged jockey wheel 12 the tape 8, which is carried on a tape drum 8^a, is pressed so that upon rotation of the ratchet wheel through one tooth the tape is fed towards the left (Fig. 3) through a corresponding distance.

The spring 7^b is preferably made somewhat weak so as to oppose as little resistance as possible to the attraction of the armature 7^a when the latter is at a distance from the pawls of the magnet 7, and the additional force required to shift the ribbon feed quickly after the key has been released is supplied by a spring 13 which encircles a plunger 14 operating in a cylinder or casing 15, a pin 14^a, extending from the plunger through the top of this casing, cooperating with a pin or projection 16 upon the armature 7^a, the arrangement being such that the pin 16 engages the pin 14^a before the completion of the stroke of the armature 7^a so that the final part of the movement of the armature serves not only to extend the spring 7^b further, but also to compress the spring 13.

The endless inking ribbon 9 is ranged at right angles to the tape 8, being carried over two pulleys 17, 18 the former of which is mounted upon a spindle 17^a suitably journaled in the framework and actuated through a worm wheel 19 by means of two substantially semi-circular worm threads 20 upon the ratchet wheel 10 which alternately engage with the worm wheel, thereby rotating the pulley 17 through a small angle each time the spacer mechanism is actuated. The other pulley 18 is journaled upon a bracket 21 which is fulcrumed upon a fixed arm 22 and urged by a spring 23 so as to maintain an appropriate tension on the ink ribbon 9.

In the arrangement of apparatus shewn diagrammatically in Fig. 6 the positive pole of the energising battery or other source of current is, upon depressing one of the keys 1, connected through one of the type bar magnets 2 and the spacer

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magnet 7 with earth or casing and thence with the other pole of the battery. In addition to this a connection is established with a similar set of magnets 2^a, 3^a belonging to a similar printing apparatus for printing the message as received by the operator in a position, as for example opposite a window in the silent room, in which the message is printed will be under the observation of the operator. Further, the diagram shows the establishment of a circuit through one of the magnets 3 and commutator 4, whereby the *en clair* message is printed.

It will be understood that the number of different interconnections possible between the magnets 2 and 3 may be increased by increasing the number of commutator bars on the drum 4, or by providing and suitably interconnecting a second similar drum for which provision is made in the apparatus illustrated in Figs. 1 and 2.

Fig. 7 shews the diagrammatic general arrangement of a duplicate apparatus for receiving and despatching cipher messages. As therein shewn two sets of Morse keys 1, 1^a are used, the former for receiving cipher messages being connected directly with the type bar magnets 2 and through the commutator 4 with the type bar magnets 3, while the keys 1^a are connected with these elements in the reverse order. The back stops 24 of the keys 1, 1^a are connected with each other and with one pole of the battery 25 or other suitable source of current, while the working or front stops 26 of the keys are similarly connected with each other and with the other pole of the battery. The spacer apparatus is omitted from this diagram.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

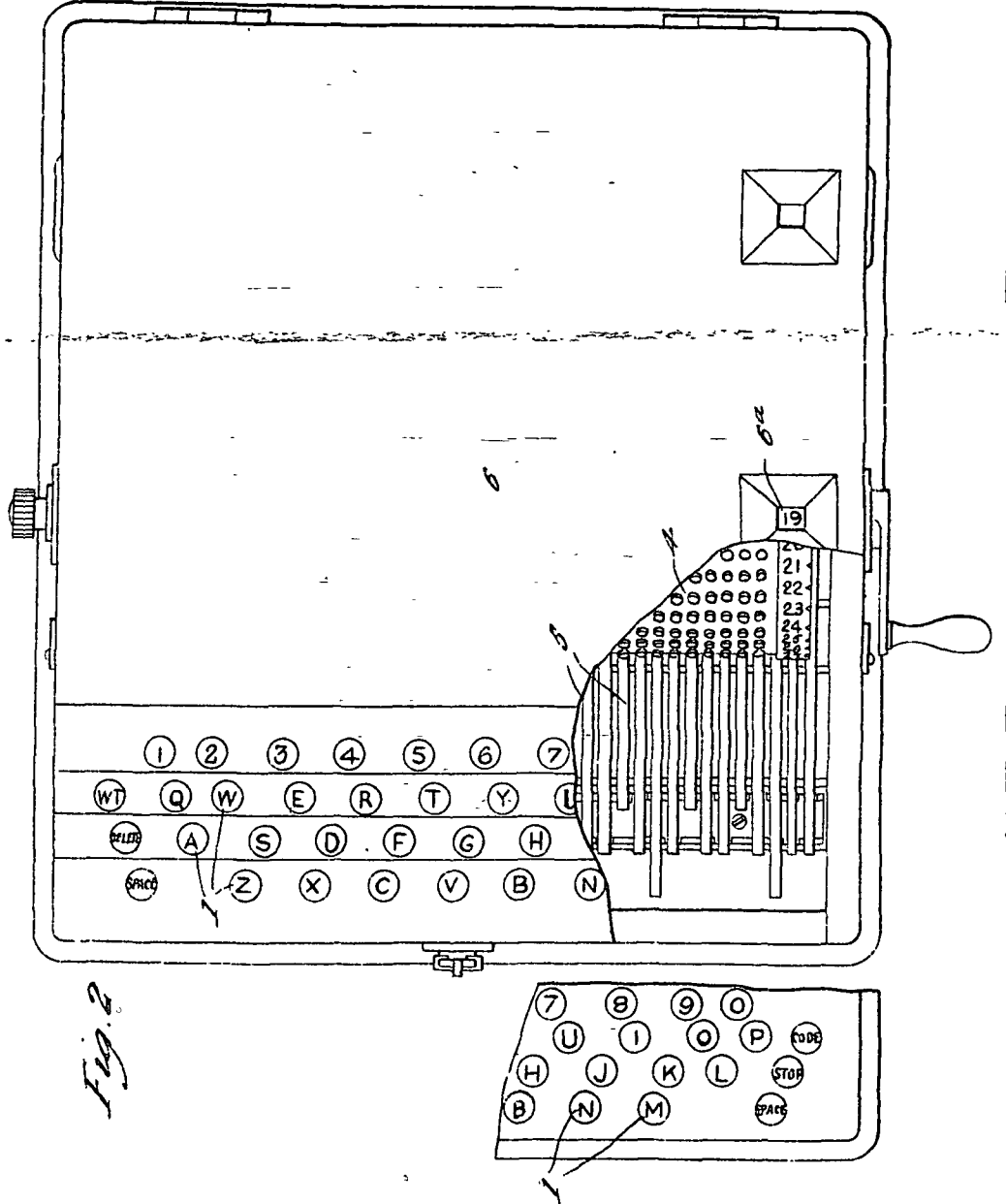
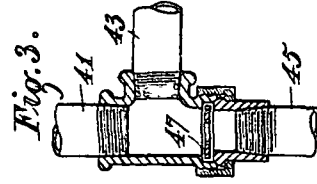
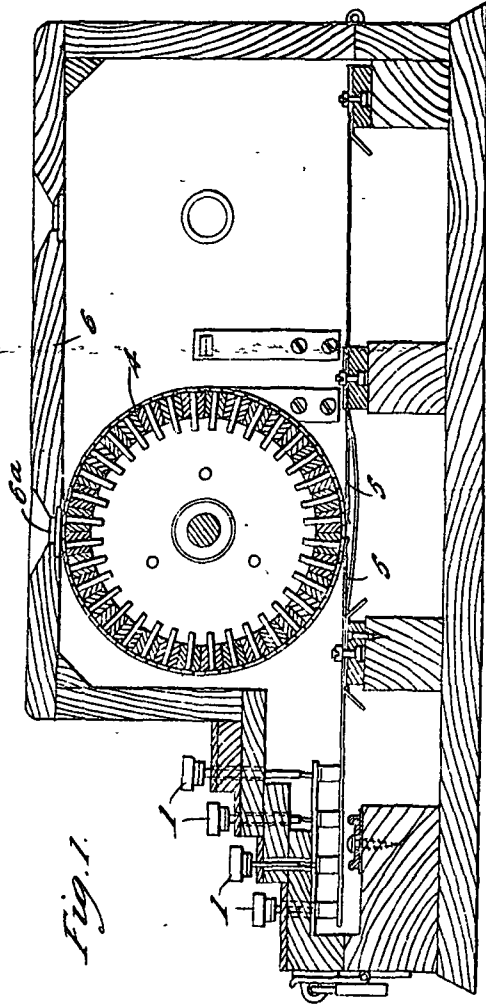
1. An apparatus for ciphering or de-ciphering messages or signals, wherein the operation of the keys of a keyboard serves to energise simultaneously two type bar magnets, one belonging to one series of magnets directly associated with the keys of the keyboard, and the other to a second set of type bar magnets interconnected with the first set through the medium of an adjustable commutator, substantially as described.
2. An apparatus according to the preceding claim, wherein the two sets of type bar magnets are ranged semicircularly opposite to each other, leaving an intervening space for the tape, whereby the message as received and as deciphered is simultaneously printed upon the same tape, substantially as described.
3. An apparatus for ciphering or deciphering messages or signals, operating substantially as herein described with reference to the accompanying drawings.

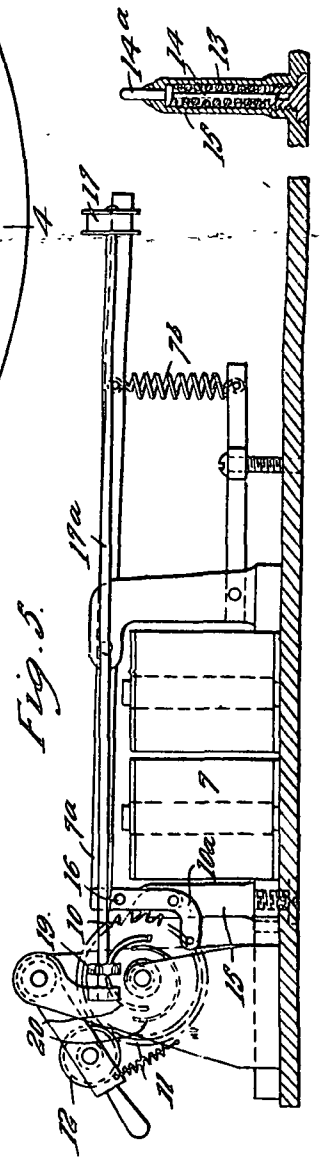
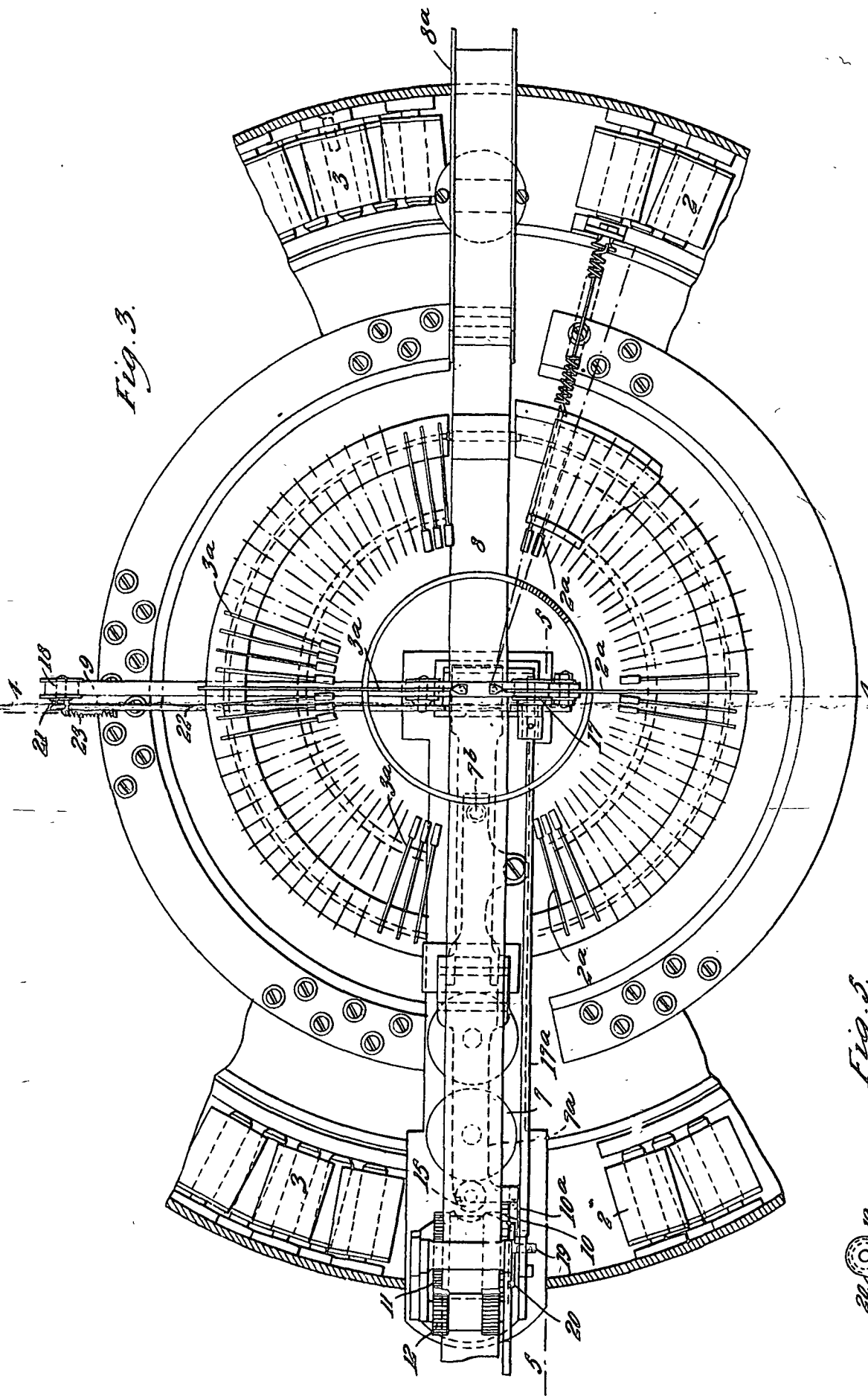
Dated this 16th day of February, 1914

40

ABEL & IMRAY,
Agents for the Applicant,
29, Southampton Buildings, W.C.

Redhill Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1914

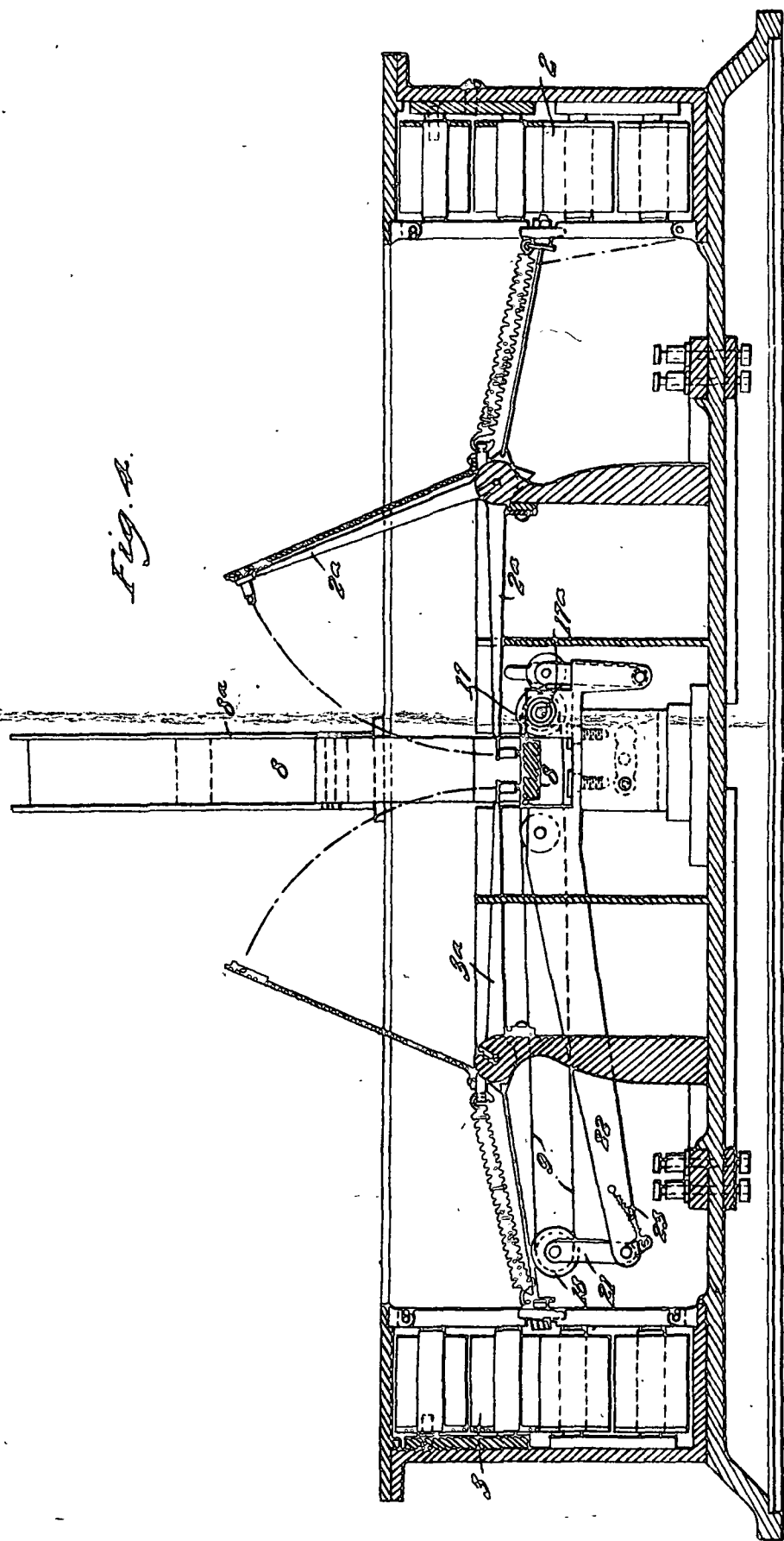




[This Drawing is a reproduction of the Original on a reduced scale.]

A.D. 1913. JULY 14. N^o. 16,192.
SCOTT'S COMPLETE SPECIFICATION.

[This Drawing is a reproduction of the Original on a reduced scale.]



Feb. 22.

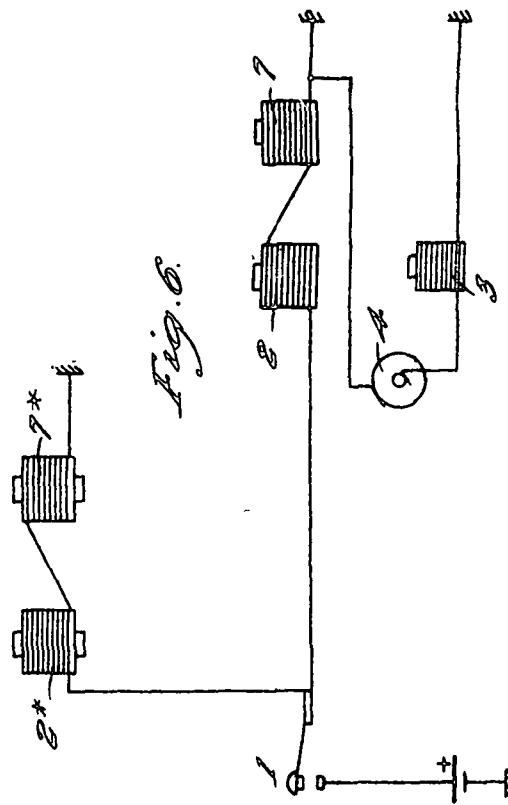


Fig. 6.

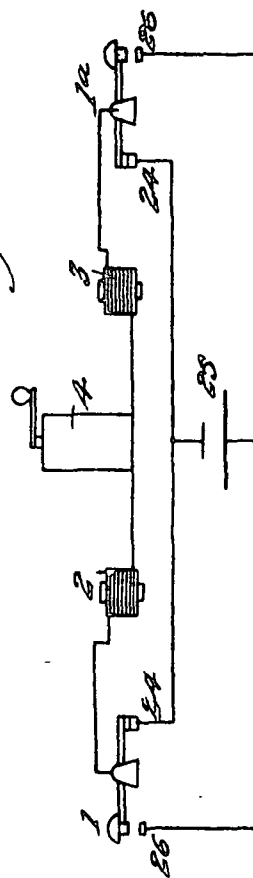


Fig. 7.

G.B. 1913-16, 1921
(cl. 100-4) (1914)?
P.M. SCOTT

N^o 22,477

A.D. 1910

Date of Application, 28th Sept., 1910

Complete Specification Left, 7th Nov., 1910—Accepted, 21st Sept., 1911

OCT 30 1911

PATENT OFFICE

PROVISIONAL SPECIFICATION.

A Machine for Ciphering and Deciphering.

I, FRANCIS FRETZ SOUTHEY, Hazeldon, Tavistock, Gentleman, do hereby declare the nature of this invention to be as follows:—

The essential parts of the machine are three *viz.* (1) the stand (2) a cylinder capable of revolving on a horizontal axis (3) a frame carrying the usual keys of a typewriter.

The cylinder carries six or more rows of studs at equal distances from one another. Each row is parallel to the axis of the cylinder & the number of studs in it is the same as the number of keys. The studs are insulated from one another. From each an insulated wire is carried inside the cylinder to one in the opposite row *i.e.* lying in the same diametric plane of the cylinder. The frame carrying the keys is insulated from the cylinder & stand but the keys are not insulated from one another. The pressure of a key makes contact with a stud in the row lying vertically above the axis of the cylinder. When the key is released a spring causes it to rise to its normal position & at the same time causes the cylinder to rotate sufficiently to bring the next row of studs vertically above the axis. The row of studs vertically below the axis is in contact with a row of insulated studs in the stand. Each of the latter studs is connected with an electromagnet. These electromagnets either operate a typewriter or are made to indicate the character to be used in the cipher despatch. The frame is connected with a suitable battery, to the opposite pole of which the wires of the electromagnets are connected. Thus when circuit is made by pressing the key A the current passes from the battery to the frame, from the A stud in the top row to some stud *x* (say) in the bottom row & so to the *x* electromagnet & the letter *x* is printed or indicated. On the release of the key A the circuit is broken & the cylinder revolves. If the key A is then pressed again a different character is printed or indicated. Thus in the cipher despatch the letter A may be represented by as many different characters as there are rows of studs. ("Characters" is used not only for capital & small letters but for digits, punctuation marks, blank spaces, & all other signs required to be printed). The spaces between two words will be represented by characters & conversely spaces will represent characters. At the beginning of a despatch a row of studs marked C must be brought vertically above the axis. To decode a despatch the opposite row marked D must be brought to the same position.

Dated the 27th day of September, 1910.

F. F. SOUTHEY.

COMPLETE SPECIFICATION.

A Machine for Ciphering and Deciphering.

I, FRANCIS FRETZ SOUTHEY, Hazeldon, Tavistock, in the County of Devon, Gentleman, do hereby declare the nature of this invention and in what manner

[Price 8d.]

A Machine for Ciphering and Deciphering.

the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to a machine by means of which a letter, dispatch or the like can be written or indicated in cipher and by means of which letters or the like written in such cipher can be readily deciphered.

The machine constructed according to my invention comprises a frame having mounted in it a cylinder carrying on its surface a series of rows or groups of studs, there being a number of studs in each row or group corresponding with the different letters of the alphabet and numerals and any other signs or symbols to be reproduced, and the several studs in each row are individually connected electrically but in an arbitrary manner, with the studs of another group or row. The frame has also mounted in it a series of keys resembling, for instance, the keys of a typewriter which are so arranged in connection with electric circuits containing an electro-magnet, that when any one key is depressed the electric circuit will be completed through the stud corresponding with the key depressed and the stud to which the last mentioned stud is arbitrarily connected, so that the electro-magnet in connection with this latter stud will be energized and operate a type-lever, to print the letter, or a device for indicating or exhibiting such letter so that it may be copied. Each key has also in connection with it means whereby the depression will cause the rotation of the cylinder to bring another row or group of studs in position with relation to the contact devices.

In carrying out my invention I advantageously provide the cylinder with six rows or groups of studs, the studs in each row being arbitrarily connected to the studs of the row diametrically opposite to it, and I arrange that the depression of the keys shall move the cylinder through an angle of 60° to bring the several rows successively into juxtaposition with the contacts on the key levers.

To enable my invention to be fully understood, I will describe the same by reference to the accompanying drawing, in which:—

Figure 1 is a diagrammatic view partly in section, and

Figure 2 is a development of a portion of the cylinder carrying the studs and illustrating the electrical connections between the diametrically opposite rows or groups.

a indicates the cylinder and the numerals 1, 2, 3, 4, 5, 6 the different rows or groups of studs *a*¹ with which the said cylinder is provided. The corresponding studs in each row are for the same letter or symbol, that is to say, the first stud in each row corresponds, say, with the letter A, the second with the letter B and so on in a manner which will be clearly understood by reference to Figure 2. The several studs of each row are insulated from one another and as hereinbefore stated each stud is connected in an arbitrary manner with one of the studs of the diametrically opposite row. As shewn in Figure 2, the studs *a*¹ of row 1 corresponding with the letters A and B are connected to the studs *a*¹ of row 4 corresponding with the letters G, H and so on, the dotted lines between the studs indicating the electrical connections.

b indicates one of the keys, or key levers, one of which is arranged in connection with each circumferential row of studs, each of the said levers having connected to it a contact device, say for instance, a rod *c* designed to make contact, when the key lever *b* is depressed, with the stud *a*¹ immediately beneath it. *d* is one of a series of other contacts which co-operate with the row of studs *a*¹ diametrically opposite to the studs *a*¹ with which the contact *c* co-operates, *e* is an electric battery connected by the wire *f* to the contact *c*, or to the guide in which it slides, and by the wire *h* to the contact *d*, an electro-magnet *i* being interposed in the circuit between the said battery and stud. Each of the magnets *i* co-operates with an armature in the form of a lever *j* which forms or operates the type-bar of typewriting mechanism of any ordinary construction, in such a manner that when the key-lever *b* is depressed to make contact with its corresponding stud *a*¹ the circuit of the magnet *i* which

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A Machine for Ciphering and Deciphering.

operates the type-bar of the arbitrarily connected stud will be completed to operate the corresponding type-bar.

The rotation of the cylinder *a* to bring the several groups of studs into coincidence with the contacts *c* can be effected in any suitable manner, in the drawing we have represented the contact bar *c* shewn as being provided with rack teeth *k* which engage with the teeth of a wheel or sector *l* mounted upon a shaft *m*, this shaft *m* carrying on a lever *n* a pawl *o* engaging with a ratchet wheel *p* fixed to a toothed wheel *q* engaging with a corresponding wheel *r* on the cylinder *a*. With this arrangement when the key *b* is depressed, the teeth *k* by engaging with the wheel or sector *l* will move the lever *n* in the direction of the arrow 1, Figure 1, so that the pawl *o* will ride over the wheel *p* without actuating the latter, and when the said key lever is released a spring *s* will lift it so as to cause the arm *n* to move in the reverse direction to the said arrow 1 so that the pawl *o* will actuate the ratchet-wheel *p* and, through the medium of the wheel *q* rotate the cylinder *a* the required distance.

It will be understood that the wheel or sector *l* for each contact is fixed to the shaft *m* and that the rack *k* will be lifted by the spring *s* out of engagement with the teeth of the said wheel or sector, so that the ratchet mechanism can be operated by the depression of any one of the key levers.

The way in which the apparatus operates will be understood by the following example:—

Suppose that the group of studs 1 is in position for contact, as shewn in Figure 1, and that the word "faced" is to be written in cipher, the depression of the key *b* corresponding with F on row 1 will operate the type lever of the letter C in row 4, and as the key *b* rises, the cylinder *a* will be turned to bring the row of studs 2 into the position previously occupied by row 1. The next depression and rise of the key A of row 2 will then operate the key F of row 5 and bring row 3 beneath the contact *c* when the depression of the key C will print the letter B of row 6. The next depression of key E on row 4 will print the letter H on row 1, and the depression of the key D on row 5 will print the letter F on row 2, so that the complete cipher for the word "faced" will be "C F B H F". If, instead of starting the cipher on row 1, row 2 be used the cipher would be "D E F G E", it will thus be understood that with the symbols arranged as described six different ciphers can be obtained.

In deciphering the first example it would be necessary to bring row 4 of the studs *a*¹ beneath the contacts *c*, and in deciphering the second example it would be necessary to bring row 5 beneath the said contacts these rows being diametrically opposite the rows used for the first letter of the said cipher, so that in all cases when deciphering a message it will be necessary to know either the number of the row of studs used for the first letter of the cipher or the number of the row of studs diametrically opposite such row or otherwise it will be impossible to decipher the message.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a machine for ciphering and deciphering dispatches or the like, the use of a cylinder or the like carrying a series of rows or groups of studs or electrical contacts, the studs or contacts of each group being arbitrarily connected to the studs of another group, and the arrangement in connection with the said cylinder of a series of key levers and a series of electric circuits containing electro-magnets or the like operating type levers or indicating devices in such a manner that when by the operation of any key lever a contact is made with a stud of any group, the letter or symbol corresponding with the stud to which the first mentioned stud is arbitrarily connected will be printed or indicated, substantially as described.

2. In a ciphering and deciphering machine of the kind claimed in Claim 1,

N^o 22,477.—A.D. 1910.

A Machine for Ciphering and Deciphering.

the provision of means whereby after the printing or indicating of a letter or symbol, the machine will be operating to bring another group of contacts into position before printing or indicating the next letter or symbol, substantially as described.

3. A machine for ciphering and deciphering dispatches or the like, constructed substantially in the manner hereinbefore described and illustrated in the accompanying drawing. 5

Dated the 4th day of November, 1910.

G. F. REDFERN & Co.,
15, South Street, Finsbury, E.C., and 10
10, Gray's Inn Place, W.C.,
Agents for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1911.

Fig. 1.

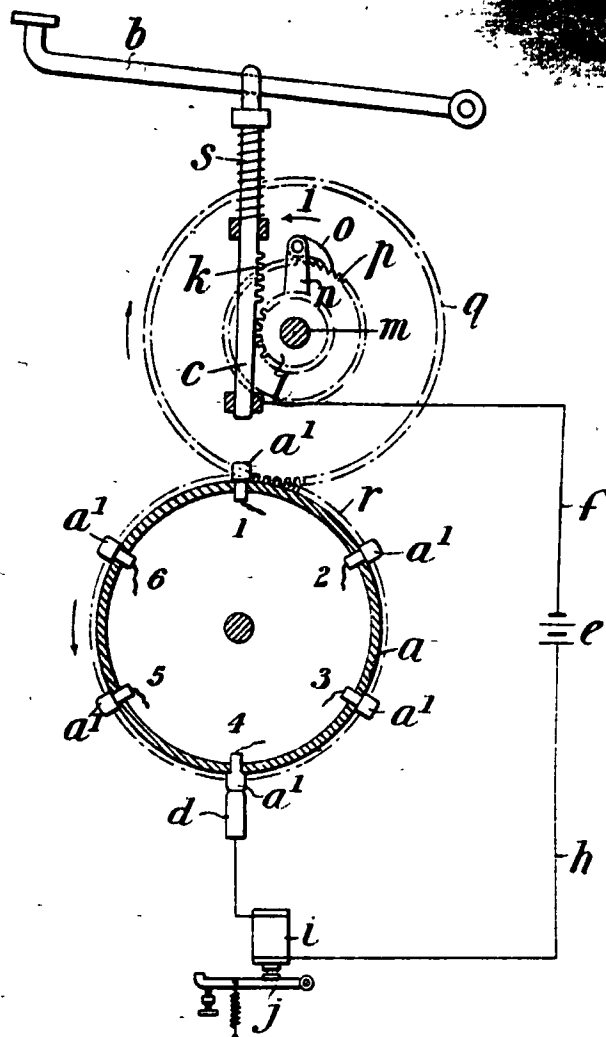
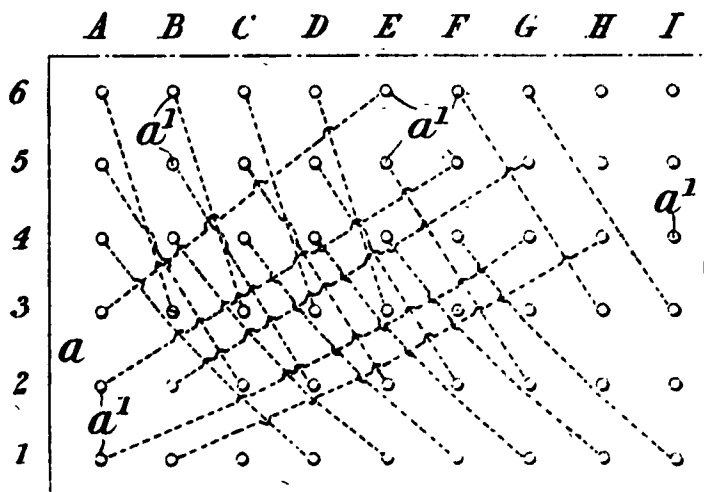


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

REF ID: A6161642 22,477

(CE 100-4)

21 SEP 1911

F.F. SOUTHBY

SEPTEMBER 10, 1947.

INVENTOR ASKS U. S. TO PAY \$50,000,000

Vallejo, Cal., Sept. 10 (A. P.).—A Vallejo law firm announced last night that an inventor of a mechanical coding and decoding machine has filed claims totaling more than \$50,000 with the United States armed forces, alleging infringement of his patents.

The claims, Attorney Ellis Randall explained, will go before the United States Court of Claims in Washington if they are rejected by the Secretary of Defense, Secretary of the Department of the Army, Secretary of the Department of the Navy and Secretary of the Department of the Air.

Randall named the claimant as E. H. Hebern of Oakland and his assignee as the International Code Machine Company of Reno. Hebern, Randall said, contends that the Navy paid him \$54,480 for thirty-one machines he had built, but refused him further compensation although many thousands of such machines were later built by others. All, Hebern's claims assert, used his patents.

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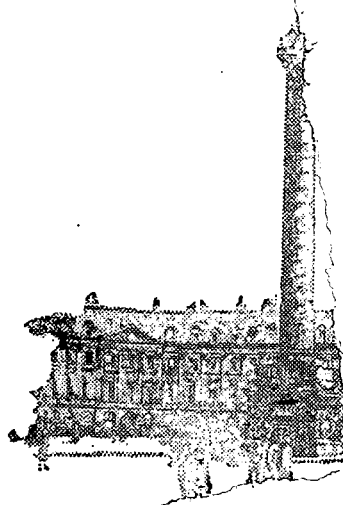


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the