P. G. G. BEYER.

CRYPTOGRAPHIC TYPEWRITER.

APPLICATION FILED AUG. 12, 1920.

1,414,496. Patented May 2, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

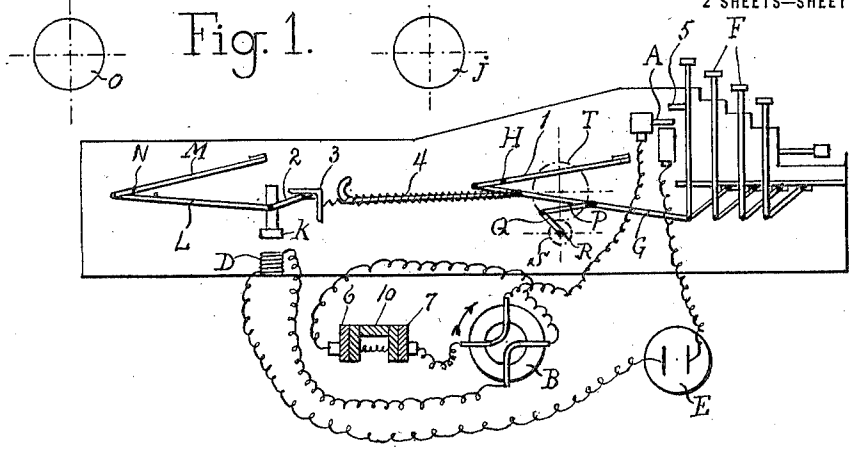


Fig. 2.

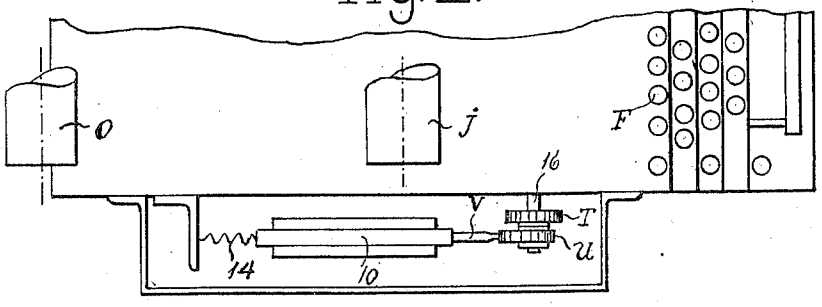


Fig. 3.

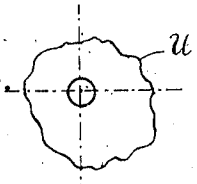
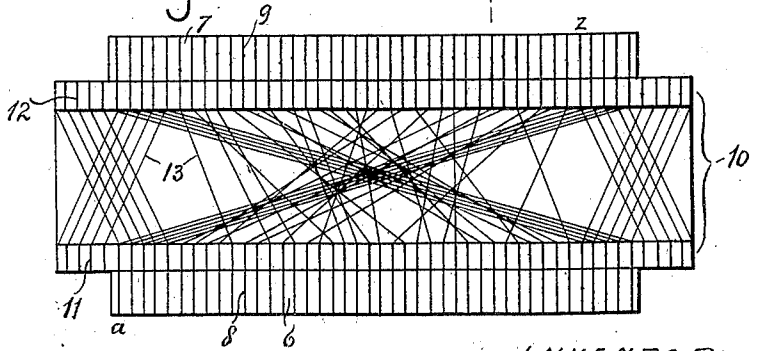


Fig. 4.



INVENTOR:
Peter Georg Grove Beyer
By Wm Wallace White
ATTY.

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2 SHEETS—SHEET 2.

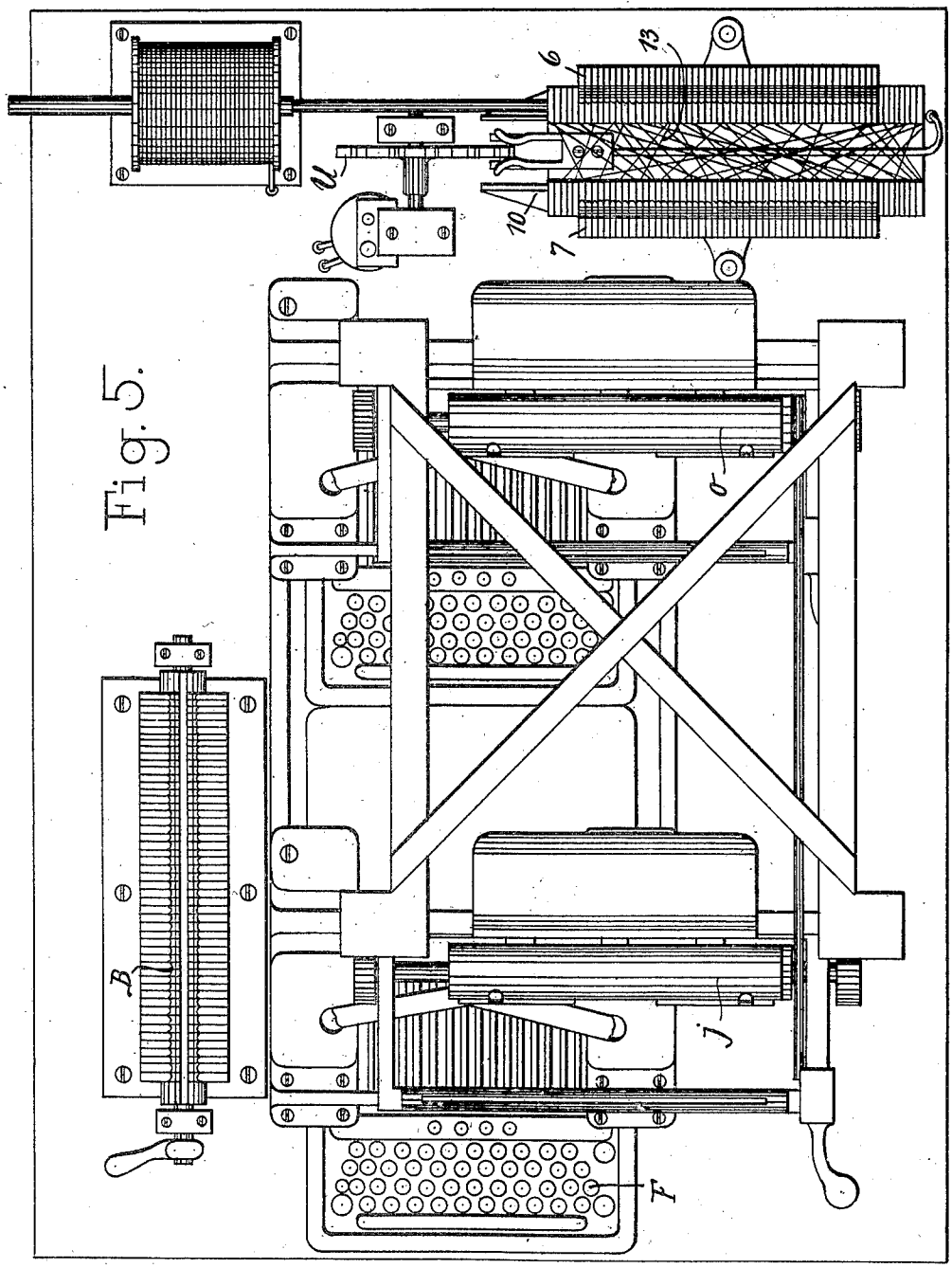

Fig. 5.

INVENTOR:
Peter Georg Grove Beyer
By Wm Wallace White
ATT'Y.

UNITED STATES PATENT OFFICE.

PETER GEORG GROVE BEYER, OF CHAILATTENLUND, DENMARK.

CRYPTOGRAPHIC TYPEWRITER.

1,414,496. Specification of Letters Patent. **Patented May 2, 1922.**

Application filed August 12, 1920. Serial No. 403,123.

To all whom it may concern:

Be it known that I, PETER GEORG GROVE BEYER, assistant, a subject of the King of Denmark, residing at Chailattenlund, in the Kingdom of Denmark, have invented new and useful Improvements in Cryptographic Typewriters, of which the following is a specification.

The present invention relates to a cryptographic machine for simultaneous writing of messages or the like with ordinary and with secret text. The object of the invention is to provide a machine of this kind by which it becomes feasible to write down, at the sender's place, a message in cryptographic alphabet which can be read only by the receiver by copying it in another writing machine, which is arranged exactly in accordance with the one used at the sender's place. This result is attained by the provision, in combination with an ordinary hand-operated typewriter or built together with the same, of another or secondary typewriter whose roller works perfectly synchronously with the first mentioned or primary typewriter and whose keys are depressed simultaneously with the keys on the primary typewriter but in different order, the said depression being determined by a distributer having a movable panel of cross-wise interconnected contacts which panel is inserted in an electric circuit between the two key systems, and is moved forward or backward by each depression of a key on the primary typewriter, closing thereby for each depression a new connection to some key on the secondary typewriter. The selection, through the distributer, of keys in the secondary typewriter is performed by means of a cam disc whose periphery is fitted with a number of projections and which is turned forward a certain distance for each depression of a key on the primary typewriter.

The invention is illustrated in outline on the drawing, where—

Fig. 1 shows diagrammatically a vertical transverse section of the two typewriters built together, some of the parts thereof being shown, for the sake of clearness, in other positions than those in which they are placed on the machines and on an enlarged scale relatively to those,

Fig. 2 a portion of the same, in top view,

Figs. 3 and 4 some details on an enlarged scale.

Fig. 5 is a plan view of a complete machine constructed in accordance with the present invention.

As the sender's and receiver's machines are identical in every respect, I shall describe herein only one of such machines. F are the keys of the primary typewriter at the sender's position, and J the roller of this machine. I are the type levers with pivot H, and G are connecting rods connecting each type lever with its corresponding key. P is a rod one end of which is pivotally connected to the connecting rod G, the other end of which is connected to an arm Q on a shaft R fitted with a loose gear wheel S. The arm Q shown diagrammatically in Fig. 1 carries a pawl which engages the gear wheel S in such a manner that the latter is unable to turn unless the lever Q be moved backward into the position shown in Fig. 1, after the corresponding key has been depressed.

O is the roller in the secondary typewriter, which roller with the parts belonging thereto may be connected to the roller J in suitable manner and may be moved in perfect synchronism with the roller J.

M are the type levers belonging to the secondary typewriter and N their pivot. The free ends of the type levers M are connected to connecting rods L which are connected, at their opposite ends, to pivoted arms 2, which are supported by an angle iron 3. 4 are spring-actuated levers which tend to maintain the keys F in the striking position.

Each key F is fitted with a projection 5, and when a key is depressed, this projection engages a switch A which is inserted in a circuit extending from a source of current E, through the switch A, a contact panel reverser B, a distributer 6, 10, 7 and thence through the contact panel reverser B and the winding of an electromagnet D back to the current supply E.

When this circuit is closed, the armature K of the electro-magnet D, which armature is attached to the connecting rod L, will be attracted, whereby the latter is caused to swing a type lever M, so that the type of the same will strike the roller O.

It will be understood that the diagrammatic showing of the typebar levers herein is intended merely to illustrate the connection of the armatures with such levers, and the particular form of lever is immaterial, it being essential only that such lever when swung on its pivot shall carry its typebar to printing position.

The particular type that strikes the roller O in response to the manipulation of any key of the primary typewriter depends on the position of the contact panel 10 at the moment when said key is depressed. As shown in Fig. 4, the distributer consists of a frame having two side bars 6 and 7, each carrying a series of contact strips or leaves, designated 8 and 9 respectively. The strips 8 and 9 are arranged in pairs opposite each other, that is to say, each strip 9 of the bar 7 is directly in alignment with a strip 8 of the bar 6. Each contact strip 9 is electrically connected through the current reverser B with the movable switch member A, which, as hereinbefore stated, is adapted to be operated by the projection or lug 5 carried by a key lever of the primary typewriter, it being understood that each of the key levers is provided with a similar lug for operating a similar switch member A into contact with a fixed switch member in electrical connection with one pole of the battery E or other source of current. Each of the contact strips 8 is similarly connected through the current reverser B and through the coil of an electro-magnet D with the other pole of the battery. Between the longitudinal bars 6 and 7 of the distributer, a sliding carriage 10 is provided, which carriage constitutes a contact panel or bridge, and carries along each longitudinal edge a series of contact strips or laminations, 11 and 12, adapted to contact respectively with the contact strips 8 and 9 of the bars 6 and 7, said strips 11 and 12 being arbitrarily interconnected by means of cross connecting wires 13. The carriage 10 is constantly urged in one direction by a helical spring 14, (see Fig. 2) supported between a fixed bracket and one end of the carriage 10, said carriage having at its opposite end an extension V the free end of which engages a cam disc U having an irregular periphery, the extension V being maintained constantly in engagement with the cam disc by means of the spring 14. The disc U is attached to a shaft 16 which also supports a gear wheel T which engages the gear wheel S and, consequently, is turned one tooth forward whenever a key has been depressed and again released. The disc U is thus rotated continuously in the same direction during operation of the typewriter, so that the carriage 10 is moved to one or the other side depending on its extension bearing against a more or less projecting portion of the disc U.

It will thus be seen that when a key of the primary typewriter is depressed a circuit will be closed through the current reverser to one of the contact strips 9, and through a contact strip 12, wire 13, contact strip 11, strip 8, reverser B, electromagnet D, and back to the battery, whereby a typebar of the secondary typewriter is operated.

When writing commences, the disc U must always be adjusted into a certain initial position and, consequently, the carriage 10 will also occupy a certain definite position in the frame 6, 7. If now for instance the key "a" of the keyboard of the primary typewriter is depressed, the circuit belonging to this key will be closed by way of the corresponding contact strip 8 of the frame bar 6, the conductor 13 of the carriage 10 terminating opposite the said strip, see Fig. 4, and by way of the contact strip 9 on the bar 7 at the opposite end of the conductor, which strip corresponds to the type "z" in the secondary typewriter. By the closure of the circuit, this type will consequently be printed on the sheet of paper on the roller O. When now the depressed type "a" is released its circuit will be opened, the disc U having been turned a distance corresponding to the angular displacement of the gear wheel T, whereby the carriage 10 is moved in one direction or the other. Consequently, if the type "a" is again depressed, the type "z" will not be printed again on the sheet of paper of the roller O, but another type corresponding to the new circuit which because of the movement of the carriage, has been established through the contact strip 8 of the type "a," the connecting conductor 13 in the carriage 10 and a connected contact strip 9 on the bar 7. In similar manner closure of the circuits for the other depressed keys F will be attained, so that in every case other types will be depressed on the sheet of paper of the roller O than those corresponding to the keys depressed on the primary typewriter. It will therefore be seen that while the text of the message proper is written legibly on the paper sheet of the roller J of the primary typewriter, there will be produced on the paper sheet of the roller O of the secondary typewriter a perfectly unintelligible jumble of letters. The latter may be deciphered only by means of a typewriter arranged exactly like the one described above and whose contact panel corresponds exactly to the contact panel in the transmitting machine and, furthermore, a disc corresponding exactly to the disc U in the transmitting machine. Finally, an agreement must have

been made in advance as to how the disc U is to be adjusted, when the deciphering operation is to commence, as this disc must be placed in the same initial position as in the transmitting machine.

When the deciphering is to commence, the contact panel reverser B of the receiving machine must be turned 90° relatively to that of the transmitting machine.

The message received is now copied on the roller J of the receiving machine exactly as it appears on the paper received. In other words, the primary typewriter must be operated so as to produce on the paper carried by its roller J a duplicate of the unintelligible message, which message will be so transferred by means of the circuits above described to the paper carried by the roller O of the secondary typewriter of the receiving machine as to produce an exact duplicate of the intelligible message as it was originally written on the primary typewriter of the transmitting machine.

By the use of other discs U with a periphery of other shape than the one shown, the text will be rendered unintelligible to everybody except the person possessing a corresponding disc. Thereby, it becomes feasible for instance for a government to send messages to its various representatives, without anybody being able to read the same except the person for whom each individual message is intended.

As it will be understood from the above, the carriage 10 and disc U are interchangeable with corresponding parts of different shape and construction, and the condition for correspondence is therefore that the ciphering machines of the sender and the receiver should have exactly the same carriage 10, as well as exactly the same cam disc U, and that sender and receiver have mutually agreed as to how the disc U is to be placed at the commencement of the ciphering and deciphering respectively.

The carriage 10 may be composed of shorter sections superimposed on each other in the shape of a block, whereby the length becomes shorter.

Instead of a sliding carriage 10 with cross-connected panel use may be made of a rotary roller on which a cross-connected contact panel is arranged in corresponding manner.

Instead of effecting the motion of the cam disc by means of the keys or the connecting bars of the same, this motion may be effected by either of the typewriter carriages, namely so that the carriage, whenever it moves one letter space forward, will turn the disc a certain fraction of a revolution. By the last mentioned manner of moving the cam disc, the device is simplified somewhat, as it will then be unnecessary to have a special set of bars for each key in order to transmit this motion.

When the source of current is removed from the writing machine, the latter may be used as an ordinary typewriter. Instead of building together a typewriter with a set of type levers and a roller belonging thereto, two typewriters may be placed together, the keys of the secondary typewriter being actuated in similar manner to the type levers of the above described construction, while the rollers should be interconnected as described above.

Having thus described my invention, what I claim is:

1. A cryptographic apparatus, comprising, in combination, a primary typewriter and a secondary typewriter, said typewriters being adapted for synchronous operation, the primary typewriter being adapted to be manually operated, electrically operated means between said typewriters, and operable on the operation of said primary typewriter for operating the secondary typewriter, and means operated by said primary typewriter for irregularly and arbitrarily selecting the typebar of the secondary typewriter to be operated on the operation of the primary typewriter.

2. A cryptographic apparatus, comprising, in combination, a primary typewriter and a secondary typewriter, said typewriters being adapted for synchronous operation, the primary typewriter being adapted to be manually operated, electrically operated means between said typewriters and operable on the operation of said primary typewriter for operating the secondary typewriter, said electrically operated means including a series of stationary contact members for the keys of each of said typewriters and a member slidable between said series and having a series of contact members for each of said stationary series, the contacts of one of said slidable series being arbitrarily connected with the contacts of the other slidable series, and means operated by said primary typewriter for irregularly sliding said slidable member thereby to select a typebar of the secondary typewriter to be operated on the operation of the primary typewriter.

3. A cryptographic apparatus, comprising, in combination, a primary typewriter and a secondary typewriter, said typewriters being adapted for synchronous operation, the primary typewriter being adapted to be manually operated, electrically operated means between said typewriters and operable on the operation of said primary typewriter for operating the secondary typewriter, said electrically operated means including a series of stationary contact members for the keys of each of said typewriters and a member reciprocable between said series and having a series of contact members for each of said stationary series, the contacts of one of said reciprocable series being arbitrarily connect-

ed with the contacts of the other reciprocable series, and means operated by said primary typewriter for irregularly moving said reciprocable members thereby to select a typebar of the secondary typewriter to be operated on the operation of the primary typewriter.

4. A cryptographic apparatus, comprising, in combination, a primary typewriter and a secondary typewriter, said typewriters being adapted for synchronous operation, the primary typewriter being adapted to be manually operated, electrically operated means between said typewriters and operable on the operation of said primary typewriter for operating the secondary typewriter, said electrically operated means including a series of stationary contact members for the keys of each of said typewriters and a member slidable between said series and having a series of contact members for each of said stationary series, the contacts of one of said slidable series being arbitrarily connected with the contacts of the other slidable series, and a rotatable cam disk operable by said primary typewriter and having a periphery adapted to transmit an irregular sliding movement to said slidable member thereby to select a typebar of the secondary typewriter to be operated on the operation of the primary typewriter.

5. A cryptographic apparatus, comprising, in combination, a primary typewriter and a secondary typewriter, said typewriters being adapted for synchronous operation, the primary typewriter being adapted to be manually operated, electrically operated means between said typewriters and operable on the operation of said primary typewriter for operating the secondary typewriter, said electrically operated means including a series of stationary contact members for the keys of each of said typewriters and a member reciprocable between said series and having a series of contact members for each of said stationary series, the contacts of one of said reciprocable series being arbitrarily connected with the contacts of the other reciprocable series, a rotatable cam disk operable by said primary typewriter and having a periphery adapted to transmit an irregular sliding movement to said reciprocable member in one direction, and flexible means for retaining the reciprocable member is contact with said cam disk.

In testimony whereof I have signed my name to this specification.

PETER GEORG GROVE BEYER.

Witnesses:
V. BELSCHNER,
T. JENSEN.