

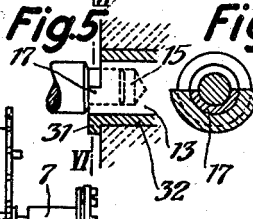
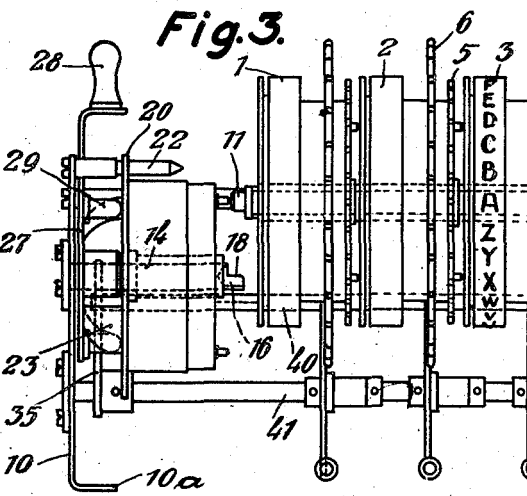
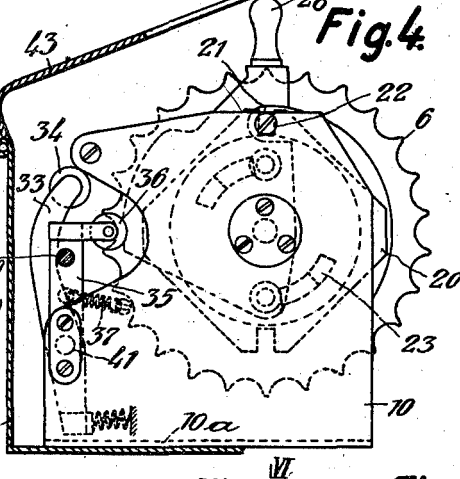
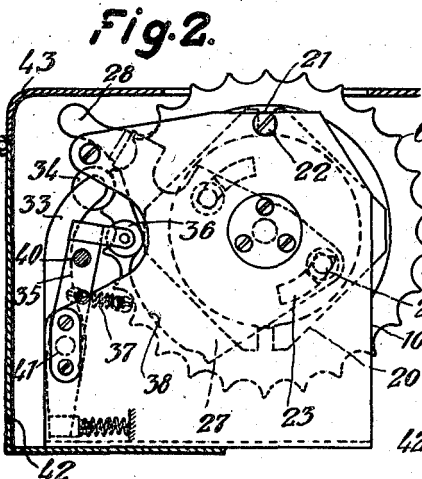
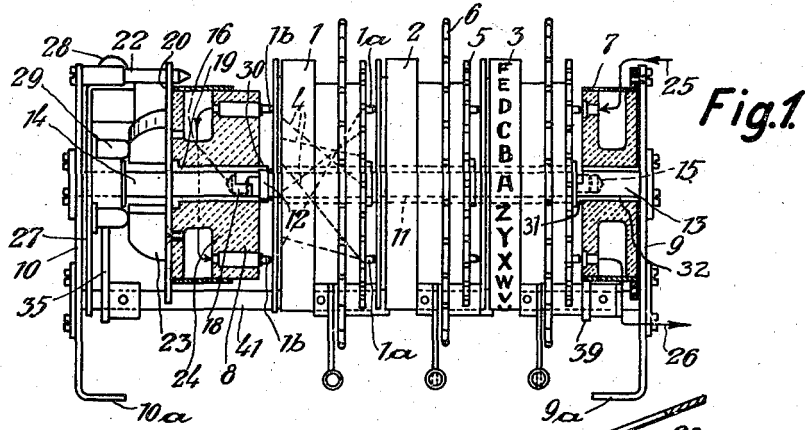
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PERMUTATING DEVICE FOR USE IN CODING MACHINES

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PERMUTATING DEVICE FOR USE IN CODING MACHINES.

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Electrical coding machines are known in which an electric current is sent from a transmitting point through a plurality of coding members, such for example as changing or permutating members, sliders or cylinders, and produces at an indicating point, such for example as glow-lamps, the keys of a typewriting machine or the like, a code letter, which corresponds to the position of the coding members relative to one another and to the associated end members. If for example as such coding members rotatable cylinders are employed, a plurality thereof are rotatably arranged one behind another on a shaft and equipped with driving means such for example as toothed wheels or ratchet wheels, which, being driven by other toothed wheels or ratchet wheels, produce a rotation of the cylinders relative to one another at each driving impulse. The cylinders are equipped on both sides with contact points, the number of which may be equal for example to the number of letters in the alphabet. The contact points of one side are connected with the contact points of the other side in an irregular manner by intermediate conductors. At both ends of such a set of rotatable cylinders are arranged stationary end cylinders, one of which serves for the entrance of the electric current and the other for its exit. When de-coding, the direction of travel of the electric current through the rotatable cylinders and the end cylinders is reversed.

The disadvantage of such coding machines consists in the fact that such a coding machine consequently possesses quite definite compulsory paths for the electric current and anyone who had a knowledge of the arrangement of the connections in the machine would have a certain possibility, by the aid of existing coded messages and of a machine in which the connections were similarly arranged, of deciphering the code. Such a coding machine moreover is always a comparatively bulky piece of apparatus, which for the purpose of maintaining secrecy must of course be kept under lock and key and requires a great deal of space.

These disadvantages are removed by the present invention in that the most important part of an electrical coding machine, namely the permutating device, is releasable from the coding machine, and is so arranged as to be exchangeable and interchangeable in its individual members.

At the same time provision is made for a particularly advantageous guiding of the electric current through the coding device.

The invention is illustrated by way of example in the accompanying drawings in which:—

Fig. 1 is a side elevation partially in section of a cylinder coding device for an electrical coding machine in the operative position,

Fig. 2 is a rear elevation of the device shown in Fig. 1,

Fig. 3 is a side elevation of the device at the moment of removal of the coding cylinder from the device,

Fig. 4 is a rear elevation of the device in a position of the parts which permits of the removal of the coding cylinders,

Fig. 5 is a partial elevation and partial section of a detail on an enlarged scale,

Fig. 6 is a section on the line VI—VI in Fig. 5.

In electrical coding machines such as have previously been mentioned there are provided a number of coding cylinders 1, 2, 3, which are rotatably supported upon a shaft. The coding cylinder 1 has contacts 1^a, 1^b, the number of which for example may be equal to the number of letters in the alphabet, on both sides, and these contacts are connected with one another in an irregular manner amongst themselves, as diagrammatically indicated by the lines 4. The coding cylinders 2 and 3 have similar intermediate connections, with a different arrangement thereof in each case. 5 denotes a ratchet wheel for driving the coding cylinder 2, and 6 a notched wheel for fixing the position of the coding cylinder 2 for the time being. The coding cylinders 1 and 3 are likewise equipped with similarly constructed driving ratchet wheels and notched wheels. 7 denotes the entrance cylinder for the electric current, and 8 is an exit cylinder for the electric current, and is in the present case of special construction, which will be further described hereinafter. The end cylinders 7 and 8 are stationary, that is to say, are non-rotatably arranged on the base plate of the coding machine, being for example rigidly connected with end plates 9 and 10 which are secured to the base plate by means of suitable feet 9^a, 10^a, or otherwise.

According to the invention the coding cylinders 1, 2 and 3, preferably together with their driving and fixing members, are so ar-

ranged as to be releasable from the coding machine. This may be effected for example by making the shaft that carries these members withdrawable towards one side, so that
 5 the above-mentioned parts can be lifted out between the stationary end cylinders.

In a particularly advantageous construction illustrated in the accompanying drawings the following arrangement is made.

10 The coding cylinders 1, 2 and 3 are slid on to a short shaft 11 which has a collar 12 at one end. For the supporting of this shaft, in the end plates 9 and 10, short pins 13 and 14 are secured, having cup-shaped end portions
 15 17 and 18 respectively with holes 15 and 16, whereby the removal of the shaft 11 is facilitated, as will hereinafter be more fully described. In order to make it possible to lift the coding cylinders 1, 2 and 3 out, one
 20 end cylinder 8 is arranged not fixedly, but slidably on the pin 14. For this purpose it is equipped with a sleeve or bushing 19 and secured to a plate 20, which determines its position.

25 This plate has a notch 21 by which its position is determined and it is guided during its longitudinal movement on a pin 22. On the plate 20 moreover are secured wedge-shaped or cam-shaped pieces 23 which serve
 30 for displacing the end cylinder 8.

In order to simplify shifting of the end cylinder 8 as much as possible, and further in order to avoid interference in the shifting operation by cables connected to the end cylinder
 35 for the numerous circuits of the individual contacts (for instance 26 such circuits), the end cylinder is not constructed for the passage of the electric current in the axial direction, but as a current-returning
 40 cylinder. The electrical connections are effected according to the lines 24, so that the electric current entering at 25 leaves the system of cylinders at 26. In this manner it is possible to keep the end cylinder 8 completely
 45 free from any connecting cable that would hinder its movement.

For the displacement of the end cylinders 8 a lever 27 having a handle 28 is rotatably supported upon the pin 14, and is provided
 50 with pressure pins 29 or the like which are adapted to act upon the wedge-shaped or cam-shaped pieces 23. If the device is located in the working position, as shown in Figs. 1 and 2, the pressure pins 29 bear upon
 55 the highest points of the cam pieces 23, and the sleeve 19 by its pressure upon the collar 12 of the shaft 11 holds them and the coding cylinders in the correct position. A suitable recess 30 bored at the inner end of the bushing 19 at the same time centres the shaft 11.
 60 At the other end of the shaft 11 the flange 31 of a bushing 32 surrounding the pin 13 forms the abutment for the set of coding cylinders.

In order to keep the coding cylinders in
 65 the correct position for the time being, that

is to say, in such a position that the individual contacts of the individual cylinders touch one another correctly, auxiliary members are provided, which will be described hereinafter, on the parts of the coding cylinder 2. 70

A spring actuated lever 33 carries a roller 34 which is adapted during the rotation of the coding cylinders to enter the notches of the notched wheel 6. Now in order to bring this lever out of contact with the notched wheels
 75 for the purpose of enabling the set of coding cylinders to be lifted out and to set the entire system free for such removal, the following provision is made:

A lever 35 with a roller 36 which is constantly pressed inwards by a spring 37, remains in permanent contact by means of this roller with the edge 38 of the lever 27. A lever 39 is arranged at the other end of the set of coding cylinders and the two levers
 85 are connected with one another by a rod 40 which is adapted to act on the levers 35 and 39 at the fulcrum of the levers. A rod 41, which forms the support for the levers 33, is preferably employed in this case as a fulcrum
 90 for the levers 35 and 39.

The set of rotatable coding cylinders with the end cylinders and the other parts just described is arranged in a casing which is indicated at 42 and which has a hinged or removable
 95 lid 43. As will be seen in Fig. 2 this lid is so arranged that in the working position of the device it just covers the handle 28, but cannot be brought into its correct position if the lever 27 with its handle 28 is in any
 100 other position. Compare Fig. 4.

The method of working of the apparatus is as follows:

For the removal it is only necessary to rock the lever 37 by means of the handle 28
 105 into a position such as that shown in Fig. 4. By the travelling of the pressure pins 29 upon the wedge-shaped pieces 23, the end cylinder 8 is thereby set free for a longitudinal displacement upon the pin 14 and the levers 33
 110 with the notch-engaging rollers 34 are lifted out of the notched wheels and pressed back. The end cylinder 8 can now easily be pushed back with the finger, and the set of coding cylinders 1, 2, 3 is free, with the shaft 11, in
 115 the cup-shaped members 17 and 18 of the pins 13 and 14, to be lifted out. Compare Fig. 3.

In this manner it is possible for example to exchange the coding cylinder 1 with the coding cylinder 2 or with the coding cylinder
 120 3 in a position upon the shaft 11, whereby the possibility is given of altering the key to the coding device. At the same time however it is also possible now, instead of one or of all of the coding cylinders 1, 2, 3, to insert other
 125 coding cylinders with other arrangements of the intermediate connections. By employing a plurality of sets of cylinders differing from one another for an electrical coding machine it is possible to make the coding ma- 130

chine itself comparatively small and with few cylinders, for example only three, as shown in the constructional example illustrated, and yet to increase the degree of safety of the cipher to an unlimited extent, such as would otherwise only be possible in coding machines in which a large number of such coding elements are connected with one another in series and which would then be comparatively bulky and expensive in consequence of the complicated driving means.

A further very important advantage consists in the fact that in the device according to the invention it is possible to take the set of cylinders, which only needs a small amount of space, under lock and key by itself and to leave the rest of the machine open, since nothing can be made of the latter by itself. For war purposes moreover the further advantage is given that in the case of a surprise attack by the enemy for example it is only necessary to take out quickly the set of cylinders or even only one cylinder, in which case the coding machine would become useless for decoding. After the removal of the set of cylinders, the cylinders are preferably withdrawn from the shaft and only the cylinders themselves taken away, the shaft 11 being put back into the device and stored with it.

For the putting in of the set of permutating cylinders it is only necessary to move the lever 27 into the position shown in Fig. 2, and by the arrangement of the cover 43 provision is made that this operation shall not be forgotten, because otherwise the cover strikes against the handle 28 and cannot be brought into the correct position.

What I claim is:—

1. A permutating device for use in coding machines including a plurality of relatively movable contact-carrying permutating cylinders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the coding device, said permutating cylinders being releasably and removably arranged in the coding device.

2. A permutating device for use in coding machines including a plurality of relatively movable contact-carrying permutating cylinders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the coding device, a shaft as carrier for said permutating cylinders, stationary pins for supporting said shaft with the permutating cylinders, and means for holding the shaft in the working position of the coding device.

3. A permutating device for use in coding machines including a plurality of relatively movable contact-carrying permutating cylinders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the permutating device, a shaft as carrier for said coding cylinders, stationary pins having cup-shaped

ends open at the top for supporting said shaft with the permutating cylinders, an end cylinder displaceably supported upon one of said stationary pins and holding the shaft firmly in the working position of the coding device.

4. A permutating device for use in coding machines including a plurality of relatively movable contact-carrying permutating cylinders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the permutating device, a shaft as carrier for said coding cylinders, stationary pins having cup-shaped ends open at the top for supporting said shaft with the permutating cylinders, an end cylinder displaceably supported upon one of said stationary pins and centering the shaft in the working position of the coding device, said end cylinder being constructed as a current returning cylinder for conducting the electric current back through the permutating cylinders.

5. A permutating device for use in coding machines including a plurality of relatively movable contact-carrying permutating cylinders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the coding device, notched wheels upon said permutating cylinders, catch levers engaging in the notches of said notched wheels and holding the permutating cylinders in the contact positions, means for supporting the shaft with the permutating cylinders, an end cylinder displaceably supported in relation to the other permutating cylinders, and means for lifting the catch levers out of the notches of the notched wheels to facilitate release of the permutating cylinders from the device.

6. A permutating device for use in coding machines including a plurality of relatively moving contact-carrying permutating cylinders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the permutating device, notched wheels on said coding cylinders, catch levers engaging in the notches of said notched wheels and holding the permutating cylinders in the contact positions, means for supporting the shaft with the permutating cylinders, an end cylinder slidably supported in relation to the other permutating cylinders, a lever rotatably supported near the end cylinder, means for displacing the end cylinder during the rocking of the lever, a cam surface on the lever, adapted to act upon means for lifting off the notched wheels.

7. A permutating device for use in coding machines including a plurality of relatively moving contact-carrying permutating cylinders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the coding device,

notched wheels on said permutating cylinders, catch levers engaging in the notches of the notched wheels and holding the permutating cylinders in the contact positions, 5 means for supporting the shaft with the permutating cylinders, an end cylinder slidably supported in relation to the other permutating cylinders, and carrying cam members on the side opposite to the permutating cylinders, a lever rotatably supported near the 10 end cylinder, pressure pins on the lever, adapted to displace the end cylinder by running up on to the cam members during the rocking of the lever, a cam surface on the 15 lever, and a lever system with a rod extending over the length of the permutating cylinders, influenced by the cam surface on said lever and adapted by means of said rod to lift the catch levers out of the notches in the 20 notched wheels when the lever is rocked.

8. A permutating device for use in coding machines including a plurality of relatively moving contact-carrying permutating cylin-

ders adapted to conduct electric current for the purpose of sign substitution in an irregular manner through the coding device, 25 notched wheels on said permutating cylinders, catch levers engaging in the notches of the notched wheels and holding the permutating cylinders in the contact positions, 30 means for supporting the shaft with the permutating cylinders, an end cylinder slidably supported in relation to the other permutating cylinders, a lever rotatably supported near the end cylinder, means for displacing 35 the end cylinder during the rocking of the lever, a curved surface on the lever adapted to act upon means for lifting off the notched wheels, a casing around the device, a lid to the casing, and a handle on said lever pre- 40 venting the closing of the lid in the rocked position of the lever.

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

WILLI KORN.