

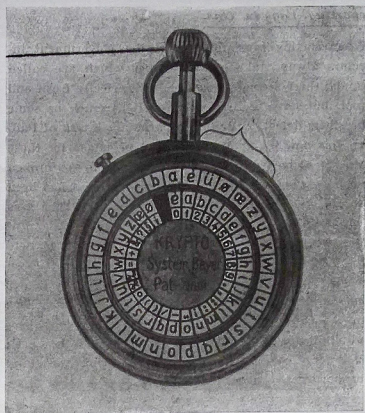
A Revolutionary Code System.

A Danish Invention making Code-Books Unnecessary.

A Danish invention has just been perfected which seems likely to become an export article with enormous possibilities. The invention consists of a mechanical device to do away with the code-books which hitherto have been necessary to all who telegraph in a language which only the initiated can read. Code-books have this serious defect that if one book in a private system is lost, an entirely new one has to be compiled, which means a great loss of time and money.

The new Danish system, „Krypto“, has not that drawback. The machine may fall into other hands, even those of the finest experts, but there would not be the slightest possibility of their decoding the cipher if they had not the key, which consists of two chosen numbers and two chosen letters.

The concern owning the manufacturing and selling rights is A/S The Danish Cipher Machine Co. Ltd., Copenhagen, the leader of which is the wellknown Danish Tokio pilot Captain A. P. Botved. The system is based upon the theoretical calculations of the late A. Köhle, a Danish engineer. He was quite a genius on this domain and had for instance compiled the codes used in the Danish foreign Office and in other countries, while during the war he was called over to London to assist the British Admiralty in altering its secret codes. One of the officials of the Danish State Railways, P. G. G. Beyer, succeeded in putting Köhle's theories into practical use, and, in conjunction with Captain Botved, the Danish Army Tech-



nical Corps and the Royal Engineers, the mechanical part of the problem has now been solved.

The company is making two types of code-machine, a small one, about the size of a watch, and a larger one working in combination with two typewriters; the two types can correspond with one another, so that the cipher arranged by means of the small machine can be decoded by the large one, and vice versa. The system of the large machine is particularly ingenious, as when a telegram is written on one machine, it comes out in code on the other; thus if the cipher message is copied on the one machine, the other writes it in clear language. The certainty of the system is considered to be perfect and the coding systems may be altered infinitely.

How the System works.

The apparatus consists of two discs, or rings, carrying two dials, divided into 30 or 26 slots, in which the alphabet is written — either in alphabetical order, or in any other order that may be chosen. An inner dial carries 30 or 26 additional slots bearing figures and punctuation marks. The discs are moved in relation to each other by means of two springs, rotation being set in motion by depressing a release spring. The movement is stopped by means of two wheels revolving on pivots, or cam-wheels, arranged with intermediate spaces of unequal size, which are numbered. The apparatus is always ready for use, the various springs being re-wound automatically.

Thus the possibility of solving cryptograms written by means of "Krypto" is extremely small; as may be seen from the following figures: the letters on the paper dials may be set in $30!^2$ (i. e. 7034×10^{11}) different combinations, the cam-wheels (in present type with nine or ten spacings) may

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be combined in 62478×176990 different settings, in order to arrive at the commencing position for a certain period of letters 80910 combinations would have to be tried before finding the right one.

The commencing position of the apparatus (the key) consists of two numbers and two letters, e. g. "46 pm". This means that the left-hand cam-wheel is put on the figure 4, the right one on the figure 6, and the letter "p" set opposite the letter "m" on inner dial. The apparatus is now ready for ciphering or deciphering. In ciphering, ordinary language is read on the strip carrying both letters and figures — and conversely in deciphering. From this it is apparent that the cryptogram will contain letters only, while the deciphered text may contain letters, figures and punctuation marks.

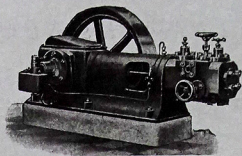
The "Krypto Magnum" ciphering machine embodies exactly the same ingenious principle as the "Krypto" pocket edition, and may be used indiscriminately with the latter. Thus messages may be ciphered with "Krypto Magnum" and deciphered with "Krypto" pocket type, and vice versa. "Krypto Magnum" appears in a somewhat different setting to his little brother, being built into two specially adapted typewriting machines and requiring an electric current (either from the mains or from batteries) to operate the "Krypto" mechanism.

All that is necessary in using "Krypto Magnum" is to write the ordinary text on one of the typewriters. The equivalent cipher text will then be written automatically by the other typewriter. To decipher merely invert the process. The time taken, therefore, for ciphering or deciphering depends merely on the speed of the typist. If necessary the two typewriters may be placed apart, even in different rooms, so that only one person at the dispatching- or receiving-end sees either the original or its transcription. When the current is not switched on the two machines may be used as ordinary typewriters.

Export Chances.

There is no doubt that the more wireless telegraphy develops, the more use will there be for codes. The position at present is that anybody who can read rapid telegraphy can tap messages sent by wireless. Thus there would seem to be great chances for the new Danish machine.

After having prepared the Danish market, where the machine has been well received, the company has organized comprehensive plans for export to every country in the world. The selling organization is almost complete in all countries, whilst the machines are being manufactured by the Danish Army Technical Workshops; the typewriters used are the Danish "Norden" make. Governments, commercial firms, the press and many others will require the "Krypto", and in fact trial orders have already been received from the governments of ten countries; these trials have come up to expectations.



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