

TRANSVERTEX HC-9

DESCRIPTION

This file contains a transcription of an original description of the HC-9 cipher machine, as it was issued by Transvertex. The date of the document is currently unknown, but it is believed to be from the late 1960s.

The original document was probably created with one of the first IBM selectric typewriters (with the rotating spherical print heads) and the typeface used by those is not available on a modern computer. We have therefore typeset the document in a font that matches the original as close as possible. The document on the next pages has been typeset in 'LondonA' font, at 12pt, stretched horizontally by 120%, with a linespacing of 150%.

The logo on the first page has been recreated from scratch, but is believed to be a close reproduction. The photographs have been recreated, as the images in the original document had deteriorated too far to be usable. The composition and angle of the original shots have been respected. The drawing of a punched card on page 3 has been replaced by the drawing of an actual card from our collection, as the arrangement of holes in the original one was incorrect. A card punched according to that scheme would not fit the machine. If you find any typos that you think were not in the original document, please contact us at the address given below.

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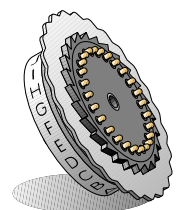
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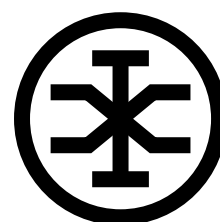
info@cryptomuseum.com
<http://www.cryptomuseum.com>

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HC-9



AB TRANSVERTEX
STOCKHOLM

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HAND-DRIVEN CIPHERING MACHINE TYPE HC-9.
DESCRIPTION.

GENERAL.

In order to meet the increasing demands for a handy ciphering machine, resistant to cryptanalysis, we can now present a quite modern, extremely simple and reliable hand-driven ciphering machine. After rigorous tests and in competition with other types of ciphering machines HC-9 was accepted by the Swedish military authorities as a standard machine.

As appears from the following, the machine offers extreme advantages both from a cryptological point of view and as regards handiness, especially concerning the interior key-setting system. The base idea of this new key-setting system is that the conventional pin-wheels, used in practically all known types of similar machines, are exchanged for cards, punched corresponding to the actual interior machine-setting desired (i.e. analogous to the setting of the pins of pin-wheels). The advantages of this arrangement are evident. The interior setting of the machine can be altered in a moment. All to be done is to open a lid, take out the non-actual card and insert a new one. Furthermore any mistakes in the setting will be prevented and there are no needs for controlrunning the machine after the setting. The machine is immediately ready for use. The previous setting can be returned to in a moment in the same way.

The dimensions of the machine are: Length: 1 1/2", Width: 6", Hight: 2 1/2", Weight: 3.4 lbs. The exterior of the machine will be clear from the photos.

CRYPTOLOGICAL PRINCIPLES.

The machine is provided with five setting-drums. The divisions of the setting-drums (number of steps for a complete cycle of running through the pins in the card-holder, see below) are 29, 31, 33, 34 and 35 respectively. The circulation (number of steps until the setting-drums return to their original position) is consequently

$$29 \times 31 \times 33 \times 34 \times 35 = 35,303,730$$

When the machine is run for ciphering or deciphering, the five setting-drums co-operate in such a way that a reading-drum provided with 16 exchangeable incoherent alphabets will stop in a position depending upon the 5-combination of the setting-drums, and the actual alphabet will appear in a window, the frame of which is provided with a direct alphabet.

The special mechanism for selecting the actual incoherent alphabet is constructed in such a way that the 32 (2^5) combinations of holes and absence of holes in a punched card (see below), depending upon the position of the five setting-drums, result in 16 positions of the reading-drum according to the principle that each position refers to one of two possible combinations, which have mutually reversed symbols (holes or absence of holes). This means that the position of the reading-drum (i.e. the exposure of a certain incoherent alphabet) can be caused by a hole in the card in a certain position as well as by absence of a hole in the same position. In other words: It is impossible to decide from the position of the reading-drum the kind of a certain symbol (hole or absence of hole in the card).



CONSTRUCTION.

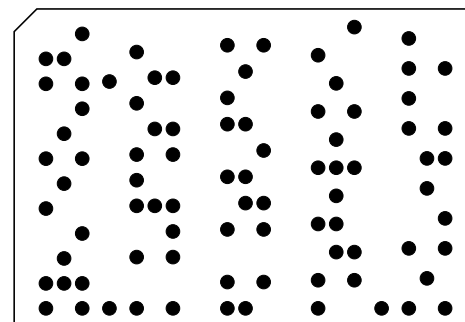
As mentioned above the machine is provided with five setting-drums, each of which is coupled to a setting-wheel, protruding through the cover of the machine, by means of which the setting-drums can be set in the position desired (exterior setting).

Each setting-drum is provided with a complete international alphabet for indicating the setting of the exterior key. When actuating the machine by the left-hand handle, each setting-drum

advances one step each time the handle is pressed down. By means of a special arrangement, pins in the setting-drum actuate loose pins in a card-holder: One pin in each setting-drum each time actuates only one pin in the card-holder in such a way that a punched card, inserted into the card-holder will stop or admit the movement of the actual pins in the card-holder, depending upon the presence or absence of a hole just in front of the actual pin. It will be clear that this arrangement can fully replace previous systems, using pin-wheels. The punching of the card is just to be done corresponding to the settings of the pins of conventional pin-wheels. To each setting-drum correspond three rows of holes and absence of holes in the card.

The possible combinations obtainable are by means of a special setting mechanism reduced from 32 to 16 and transported for setting the reading-drum, provided with 16 changeable incoherent alphabets. The incoherent alphabets on the reading-drum can easily be read against a direct alphabet in a window.

A 4-figure counter is coupled to the main setting-shaft, which on the outside is provided with a knob, by means of which the setting-drums simultaneously can be turned to the position desired, when a release-arm is pushed.



HANDLING.

Interior setting 1. Push the card-holder release-arm to the right and open the card-holder lid. Replace the non-actual card by a new one and close the lid again.

Interior setting 2. Open the right-hand lid by pushing the release-knob and pull out the reading-drum. Open the paper-holder and remove the non-actual paper. Wind up the new paper with its markings corresponding to those of the reading-drum and close the paper-holder. Insert the reading-drum and close the lid.

Exterior setting. Turn the protruding setting-wheels in the direction desired for getting the combination of letters desired on the setting-drums into the line-marking in the top-side window.

Now the machine is ready for operation.

Turn the left-hand handle in clockwise direction until it stops and then release. After that read the first letter of the plain text in the direct alphabet against the incoherent alphabet, appearing in the window. Turn the handle again and read the next letter and so on.

When deciphering, read the enciphered text in the direct alphabet just in the same way as described above, when enciphering. It is necessary of course that the printed incoherent alphabets are reciprocal in relation to the direct alphabet.

The HC-9 type is constructed for direct use of Hollerith-printed strips of incoherent alphabets or their reproductions, but it will be clear that any other system of printing with other moduls can be used with slight modification.