

2. Each Drum Bar has a fixed number of Lugs. Drum Bars 1 through 9 have 6 Lugs each (3 on each side of the partially separated Drum); Drum Bars 10 through 18 have 4 Lugs each (2 on each side of the partially separated Drum); and Drum Bars 19 through 27 have 2 Lugs each (1 on each side of the partially separated Drum). Provisions for neutralizing the effect of every Lug is made by zero positions on the Drum Bars. For example:

Left side of Drum

1 ∅ 2 3 ∅ 4 5 ∅ 6

Right side of Drum

1 ∅ 2 3 ∅ 4 5 ∅ 6

As the Drum is turned by the Driving mechanism, the Lugs are engaged by the effective Guide Arms, shifting the Drum Bars to the left (effective) position. The Drum Bars are reset to the right (ineffective) position by the Drum Bar Retractor. The number of effective Lugs thus depends upon the number of Lugs which engage one or more effective Guide Arms.

D. Print Wheel and Reproducing Disc are located on a common shaft on the left side of the machine and are operated mechanically through the medium of the Print Wheel intermediate gear during the operation of the Drum.

1. The Print Wheel is adjacent to and just inside the Reproducing Disc and bears an alphabet in normal order and in the same direction as that on the Reproducing Disc but offset a certain number of places. Printing occurs after the second complete revolution of the Drum. (All Key Wheels have stepped twice during this operation).

2. The Reproducing Disc bears the alphabet in normal order. At the end of each operation (2 complete revolutions of the Drum and 2 steps of all the 12 Key Wheels), the letter visible on the Reproducing Disc and closest to the Indicating Index is the letter which has been printed.

E. The Encipher/Decipher Knob controls the spacing of the letters on the tape and the printing of the letter "Z". When set at "C", the tape is advanced an extra space after each 5 letters, thus spacing the text into 5 letter groups. When enciphering, the letter "Z" is used for spaces between the words of plain text. When set at "D", the printing on the tape is spaced normally, but the letter "Z" will not print. Words such as ZERO and RENDEZVOUS will appear as ERO and RENDE VOUS and must be completed by inspection.

F. A Keyboard is located at the front of the machine and the text is typed directly into the machine. Drum and Key Wheels are operated by a manually operated Drive Arm on the side. Operating speed is limited due to the mechanical limitations. A description of the manner in which the Print Wheel is given its initial displacement from the Keyboard is beyond the scope of this paper. It is sufficient to state that it is simple and reliable and an adaptation of standard adding machine technique developed by the Remington Rand Company for the Government. It accomplishes by depression of a Key, what is accomplished in the original Hagelin Machine by turning the Print Wheel until the desired letter on the Reproducing Disc appears opposite the scribed reference line on the machine.

G. Manual Drive Mechanism

H. Motor Drive Attachment

I. Cover

6. KEY LIST AND INDICATOR SYSTEM.

A. Key List provide for the Lug positions, Pin Settings, and a 30 letter check, as a means of checking the key setting and operation of the machine. The sequence of 30 letters given is the encipherment of the letter "A" on the 1st through 30th steps inclusive from zero position, using Pin Settings and Lug Positions given in the Key List, with the initial Key Wheel alignment of "AAAAAA AAAAAA".