

**PROPOSAL FOR A SLIGHTLY DIFFERENT DESIGN (9)  
OF TESTING ENIGMA.**

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The ordinary German enigma machine has only one row of pins and plates on each wheel - as shown below

The entry consists of one row of 26 plates. If P - Q is a pairing in a certain position the electrical circuit through the wheels is exactly the same whether the P key or the Q key is pressed: the current merely traverses this circuit in opposite directions in the two cases.

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The Letchworth enigma has, effectively, two rows of terminals on each side of the wheels - making four rows of brushes in all. In this machine the input and output sets of terminals are not the same, & the circuits P to Q are not identical when these keys are separately pressed. In fact there are two sets of parallel circuits in the wheels, one for the outward circuit & one for the inward circuit.

When set up the Letchworth enigma circuit is as follows :-

\_\_\_\_\_ 26 - way double ended jacks  
\_\_\_\_\_ commoning jacks

In this diagram the rows of terminals  $\alpha$  &  $\beta$  - i.e. the input and output terminals of the enigma - are actually the outside & inside rows (rows 1 & 4) of the brush plates.

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What is now proposed is a wiring very similar to that used on the X - machines, except that the wheels shall be side by side instead of gripped together. We envisage a drum with two rows of spring contacts (pins) instead of the four rows of brushes. These pins would be connected together inside the drum in exactly the same (non - reciprocal ) way as the pins and plates of a wheel are now connected. Of course there would be only one set of input - and - output terminals - not two, as in the Letchworth enigma.

The enigma as set up would then be as follows :-

A key :- When it is "up"  
1 & 2 are connected  
When it is "down"  
2 & 3 are connected  
( & 1 & 2 broken)

\_\_\_\_\_ 26 - way double ended jacks  
\_\_\_\_\_ commoning jacks

Other points which this configuration would involve are :-

- (i) The drums would be held down by buttons - or some similar spring device.
- (ii) The drums would be able to turn both ways - necessitating some spring control to prevent them from stopping between positions. This would preferably be done on the spindle underneath the discs which contain the "plates", ( i.e. inside the machine, as the ratchets on the Letchworth enigmas are).
- (iii) It would be a help to have a R.S. disc instead of a clip control.
- (iv) A slightly different keyboard would be needed. It would have three terminals to each relay ( the present keyboard has only two ) - and consequently it would have three sockets for the 26 - way jacks.

(v) The lampboards would not have to be altered; and of course this arrangement would work perfectly well with a "Shadowgraph" type of lampboard.

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This arrangement would have several obvious advantages - in particular the ability to turn the wheels backwards, the R.S. adjustment by a disc is less hard on the finger nails than by a clip, & the contacts would be more foolproof. Of these the last will I think, save most time. The brushes are far too delicate for the treatment they receive, and, however carefully they are looked after, will always give a certain amount of trouble.

I do not think that the above type of machine would be quite as quick to work as an ordinary cyclometer enigma, but, for girls at any rate, it would be much easier to work with. If a large number of new machines are being ordered it might be well worth while to get as foolproof a plan as possible before deciding on a design.

O.H.L.