

WAR DEPARTMENT
OFFICE OF THE CHIEF SIGNAL OFFICER
WASHINGTON

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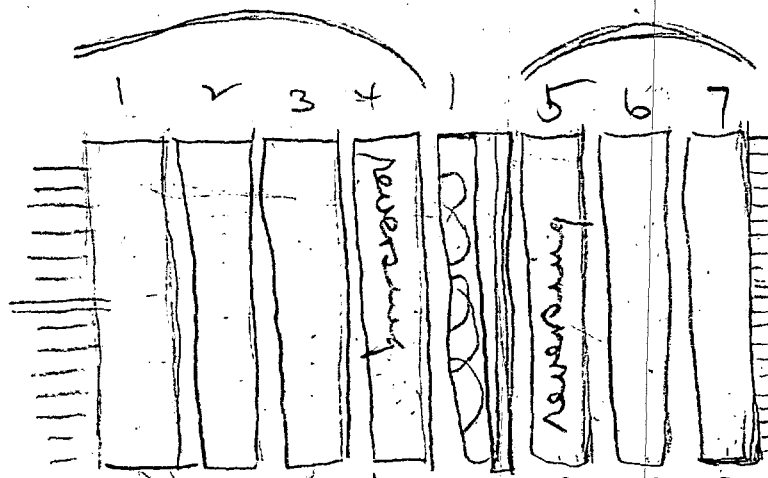
September 3, 1935

**Invention of Mechanico-electrical Control of Cipher Wheels
for Small Cryptograph.**

1. Have 3 substitution wheels with Enigma type return circuit, and 2 control wheels also with Enigma type return circuit.
2. The control wheels are moved meter-like by universal bar. Periods: 676.
3. The 25 available final resultants of control wheel circuit are divided up into 3 groups of primes. Examples: Group 1, of 5 resultants, to control movement of substitution wheel 1; Group 2, of 9 resultants, to control movement of substitution wheel 2; Group 3, of 11 resultants, to control movement of substitution wheel 3. Other groupings of primes may be desirable.
4. The control wheel circuits merely operate small magnets which interpose stop-links between a rocker frame and recesses in the substitution wheels, or the teeth of a ratchet on substitution wheels. The rocker frame is operated mechanically by universal bar, or by hand lever, or foot lever, or by magnet.

William F. Friedman.

17576



← 4 currents in 1441

25 current-out currents
divided up into 4 groups.
3 groups of 7 + one group of 5
or
group 1 2 3 4 5
3-1
4-1
7-5

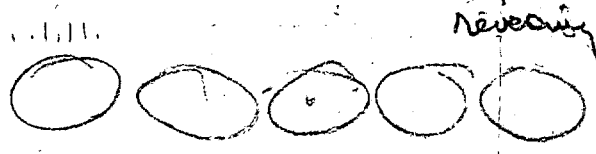
magnets for stepping, controlled by these

control wheels (same as cipher wheels)

These move in meter-like manner, universal bar steps wheel 7 once per depression, 6 once per 26, 5 once per 676 - total 17576.

But five wheels are interchangeable, any two reversing wheels are also interchangeable, hence many series of "17576 keys".

$2 \times 10 \times 8 = 160$ keys of 17576 letters



About Aug 1, 1935
W.F.