TO Chief Signal Officer

THROUGH: War Plans and Training Division

The undersigned have made a further study of the system proposed in the original sketch accompanying basic memorandum with the result that an important modification has been made therein which it is believed has eliminated the features about which the Patent Board expressed question as to practicability. This change provides that at no point on the steel tape is there ever impressed more than one set of voice frequencies, the superimposition of sets of frequencies being accomplished by electrical mixing in transformers rather than by successive magnetic impressions on the steel tape. A search has been made, at our own expense, in the Patent Office and there appear to be no conflicting issued patents dealing with similar means for accomplishing the purpose of this invention, although the Radio Corporation of America and some other organizations have patented different schemes for accomplishing a similar purpose.

The undersigned believes that this modification eliminates the technical objections on which previous action of the Patent Board was based. It is also believed that the invention now appears to be so practicable as to warrant it. Therefore, I request that the Board be asked to reconsider the invention in view of the modification now proposed. A sketch of the system as it stands at the present time, together with a brief explanation, is attached hereto.

If, as a result of the findings of the Patent Board, the Chief Signal Officer is still of the opinion that this is not warranted in patenting this invention through regular government channels, the undersigned respectfully request permission to patent the invention at their own expense with all rights reserved to themselves.
Attention is invited to an article in the recent issue of the Bell Telephone Journal, which indicates that recent great advances in the art indicate that our invention is technically practicable.
Transmitting end: Electrical oscillations corresponding to input signals are recorded on a moving steel tape; the tape passing in the direction shown between the paired impressing magnets 1. The tape then moves between paired reading magnets 2, 3, 4, and 5 which pick up the signals on the tape and pass them into modulating amplifier 6. Thence the signals go through power amplifier to output. Thus, the final output corresponds to a sequence of blocks of algebraically superimposed frequencies representable by A, AB, ABC, ABCD, BODE, CDEF, ..., the A block of frequencies coming at the head of the train. Except for the first block, A, each block of frequencies is mixed with one to three blocks preceding it.

Receiving end: Received signals are led to receiver and thence to transformer 7, which has three coils. Signals from the transformer 7 are impressed on steel tape by impressing magnets 1', and simultaneously led to amplifier 8, for final output. Signals on the tape then pass under reading magnets 2', 3', and 4', which feed into amplifier 9. Output of the amplifier 9 is reversed in polarity and led to transformer 7. When the block of frequencies represented by A is received, there is nothing on the tape for reading magnets 2', 3', and 4', to pick up. Hence A is final output. When the block of frequencies represented by AB is received, reading magnets 2' are reading the A block, and these frequencies are fed back to transformer 7 through amplifier 9. This neutralizes A from the received block AB, leaving only B. In the same way when ABC comes in, the reading magnets 2' and 3' feed back -A and -B, neutralizing the latter from ABC and leaving only B, etc. The cryptographic principle consists in micrometrically varying the distances between the impressing and reading magnets at the two ends, the variations being determined by prearranged cipher keys. While in this embodiment steel tapes and magnetic recordings are used, other media may be employed for recording the basic principle being the mixing with the signals, recordings of signals which occurred during previous time intervals.