

IN THE UNITED STATES PATENT OFFICE

In re application of
 William F. Friedman,
 Filed October 23, 1936,
 Serial No. 107,244
 Cryptographs

Division 53, Room 6897

August 24, 1937.

Hon. Commissioner of Patents,

Sir:

Responsive to Patent Office Action of March 6, 1937.

Claim 8, line 2, cancel " cams " and substitute - - cam
 positions - -

Claim 10, last line, after " permutative " insert - - and
 aperiodic - -

Claim 12, line 2 from the bottom cancel " cams " and sub-
 stitute - - cam positions - -

REMARKS

In Hebern cited, it should be noted that the movements or
 displacements of the code wheels are purely mechanical ; these movements
 are regular or periodic in character and are controlled by ratchet mech-
 anisms internal to the device itself. Periodic or meter-like recurrence
 of movements is a natural characteristic of all such mechanisms and the
 predictable factor thus introduced defeats the essential purpose.

Hebern shows commutators, but does not show means to effect permutative, step-wise movement of the commutators. In other words, the means employed in Hebern to effect the movement does not do so in a true permutative sense, as will be seen from a study of the operation as set forth in said patent. Referring to Fig. 8 of Hebern, consider the action of the ratchet wheels as described beginning on page 1, line 78 et seq. Here when a ratchet wheel having twenty-six teeth completes one revolution the adjacent wheel is advanced one step, for example, ratchet wheel 5^a and code wheel 75^a are rotated only one notch while the ratchet wheel 5^c is being rotated for twenty-six notches or one revolution. Ratchet wheel 5^c moves only one notch while the ratchet wheel 5^d moves twenty-six notches and since wheel 5^a moves only one notch while wheel 5^d moves twenty-six notches, and since wheel 5^b moves only one notch while 5^c moves twenty-six notches, wheel 5^a moves one notch while 5^d makes six hundred and seventy-six revolutions. Thus, the displacements of the code wheels are fixed i.e., meter-like and periodic when controlled in the manner described in said patent. This theory of operation does not justify the idea of introducing cam-bearing members in such a structure in an effort to meet the combination claimed by applicant. An attempt to use the cam-bearing members as disclosed in either of the Damm patents, as suggested by the Examiner, to build up a mental anticipation must fail because the periodic or meter-like recurrence of movements in Hebern precludes cryptographic action.

It is difficult to see how the substitution suggested by the Examiner could be effected at all to produce the operative

structure claimed by applicant. In the earlier Damm patent No. 1,540,107, the cam device to which the Examiner calls attention as shown in Figs. 2 and 3, is a unitary structure described as a "secondary key". When it is considered that no commutators are disclosed at all in this patent, and bearing in mind that Hebern is open to the objection noted above, it is contended that the cam device cannot be successfully aggregated with Hebern to effect permutative displacements of the commutators, that is, to secure true cryptographic action. The combination called for by the claims could not be set up by such an aggregation of parts as found in the patents relied upon without a complete reorganization of the parts which would amount to invention. The other patent to Damm No. 1,644,239 is even less pertinent. Here the cam elements are carried by an endless chain and it is even more difficult to see how the cam devices could be introduced into Hebern and made to operate at all. Certainly, these cam elements could not be obviously combined in Hebern to meet the combination claimed in the present case.

As to applicant's prior patent also cited, only one commutator is there disclosed whereas in the present case all the claims include a plurality of juxtaposed rotatable commutators, except claims 12 and 13, in both of which the term "switch" is employed and the language clearly implies a plurality of such switch devices. Moreover, said prior patent does not disclose cam-bearing members in the sense employed in the present invention. In this earlier patent cams do not control the step-wise displacements of the commutators either alone or in combination with

other elements. In that case the key-tape of a tape transmitter was employed to secure irregular action. Again, it is contended that the cam device of either of the Damm patents would not work in the structure of Friedman cited without material reorganization of the apparatus, which would require invention for the same reason as noted in discussing Hebern.

It should be further noted that Hebern does not have means electrically associated with the cam bearing members to effect permutative action. Some of the claims in the present case bring out this distinction. Attention is also called to the fact that the numbers of the cam positions on the respective cam-bearing members are prime to one another, which constitutes a further important distinction in favor of applicant's invention as brought out in one way or another in several of the claims. In this manner the complete period of the whole system of cam wheels is greatly lengthened and a much greater degree of cryptographic security is thus secured. Another advantage in favor of the present system arises from the fact that the cam-bearing members act both independently and collectively.

Favorable reconsideration is courteously requested in the light of the foregoing.

Respectfully submitted,

William F. Friedman,

By:

Attorney