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DEPARTMENT OF THE NAVY
OFFICE OF THE JUDGE ADVOCATE GENERAL
WASHINGTON, D. C.

Sep 30 1932

From: Judge Advocate General
To: Secretary of the Navy.

Subject: Electric Ciphering Machines - patent situation with regard thereto.

References: (a) Bu.Eng. let. to J.A.G. C-S67/68(8-25-W9)
confidential dated 2 Sept. 1932
(b) Description and four blueprints of Bu. Eng.
Design Coding Machine.
(c) Patent to Hebern 1,510,441
(d) Patent to Hebern 1,683,072
(e) Patent to Hebern 1,861,857
(f) Korn 1,705,641
(g) Korn 1,733,886
(h) Bernstein 1,777,425
(i) Scherbius 1,556,964; 1,584,660 and 1,657,411
(j) Hagelin 1,846,105
(k) Wahnoe 1,472,775
(l) Beyer 1,414,496

1. The Judge Advocate General has been directed to render an opinion on the scope of the patents to Hebern Nos. 1,510,441; 1,683,072 and 1,861,857, references (c), (d) and (e), as to the liability for infringement by the device shown in reference (b) of the several patents constituting reference (c) to (l) inclusive, and as to the patentability of the device disclosed in the Bureau of Engineering design for a coding machine, reference (b).

2. Hebern 1,510,441, reference (c), discloses a coding attachment to be used with an ordinary typewriter whereby when a message is written by striking the coding keys in the proper sequence to spell out the words, different or coded letters will be printed. Each coding key operates, through variable circuits, a solenoid that is connected to depress a typewriter key. Inasmuch as the claim in the several patents to be considered are very numerous, they will not be discussed individually, but the elements included in each claim that distinguish such claim from the design shown in reference (b) will be pointed out.

(a) Claims 1, 3, 4, 12 and 13 specify that the contacts on the coding wheels are connected in complementary pairs whereas, in the design of reference (b), the connections are entirely at random.

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(b) All the claims specify electrically operated printing key actuating means; that is, the coding keys merely control the solenoids that operate the typewriter keys, thus involving two full keyboards.

(c) Claims 1, 3, 4, 12 and 13 include the limitation of a plurality of circular series of contacts arranged in the same fortuitous order.

(d) Claims 2, 3, 4 and 16 to 21 all include a circuit controller to prevent sparking at the key operated contacts when the circuit is broken.

(e) Claims 5, 6, 7 and 8 set forth that the code wheel is shifted by the printing key mechanism, whereas the device disclosed in reference (b) has the code wheels shifted by the manually operated keys.

(f) Claims 16 to 21 are almost exclusively drawn to the circuit controller mechanism.

3. Hebern 1,683,072, reference (d), shows a plurality of coding wheels each of which is connected by means of ratchet fingers and shafts to corresponding ratchet wheels. Each ratchet wheel has a peripheral track flush with the end faces of the ratchet teeth and having a single notch therein, all the ratchet wheels being so interconnected that the second code wheel is moved one space only after the first code wheel has completed a full revolution, and the third code wheel is moved one space after the second code wheel has completed a revolution, etc. In addition to the keyboard there is a set of code characters each illuminated by a lamp which is lighted when the corresponding code character is printed. There is a separate set of circuits for use in decoding from that used in coding.

(a) Claims 1 to 5, 30 to 32, 37, 39, 41 to 46, 53, 55 to 57 all include the limitation that one ratchet wheel is actuated only once while another makes a complete revolution.

(b) Claims 6 to 15, 24 and 36 include the finger and lever means for rotating the code wheels.

(c) Claims 17 to 24 include the peripheral ribs on the ratchet wheels each rib having in it a single notch.

(d) Claims 41 to 49, 54 and 55 specify that the code wheels are rotated at definite relative speeds.

(e) Claims 39 to 53 include both language and code characters, the code characters referring to the illuminated windows each of which carries a code character.

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(f) Claim 34 includes the code indicating means, i.e., the lamps.

(g) Claims 51 to 53 include the cam controlled ratchet mechanism to rotate the drums. In this case the cams merely control the ratchet mechanism and do not serve as part of the ratchet operating means as in the Navy design coding machine.

(h) Claims 8 to 16 include the movement of the code wheels when in predetermined positions.

(i) Claims 25 to 29, 33, 35 and 38 include the limitation of separate coding and decoding circuits.

4. Hebern 1,861,857, reference (e), discloses an electric coding machine having two sets of type bars, one of which prints the message in English, the other in code. There are three sets of solenoids - one for the English type bars, one for the code printing type bars and one to move all the code wheels simultaneously. The message is printed in English and in code side by side on a tape. A mechanism being provided in the machine to split the tape between the two messages. The stiff wires that connect the English type bar solenoids to their respective type bars are made slightly shorter than those that connect the code solenoids to the code type bars to compensate for differences in the electrical characteristics of the two circuits to obtain equal impressions from the two sets of type. This feature is set forth in certain of the claims as means to equalize the printing pressures but it is obvious that such equalization is far from complete and does not refer to equalization of pressures among the several type bars of one set.

(a) Claims 1 to 8, 35, 38 to 45 and 58 to 60 all include both the language and the code symbols, i.e., the two sets of type bars.

(b) Claims 9 to 24 and 53 specify cam means revolving with the code wheel.

(c) Claims 25 to 30 include cam profiles on the code wheels, while claims 54 and 55 specify cam profiles associated with the code wheels. These cam profiles are to actuate a mechanism that will rotate other of the code wheels at predetermined intervals.

(d) Claims 18 to 22 specify that the ratchets may be connected to one or more cams.

(e) Claims 31, 32 and 33 include means for holding the code wheels immovable. The device shown in reference (b) has no means for holding the wheels, they are simply not moved. There is also the limitation of rotating all code wheels simultaneously.

(f) Claims 32 to 36, 56 and 57 specify power driven means to

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rotate the code wheels simultaneously. This refers to the set of electromagnets termed the "power magnets".

(g) Claims 39 to 45 and 58 to 60 include both coding and decoding circuits.

(h) Claims 46, 47 and 48 specify a code symbol selector. This refers to means for connecting the space bar to a coding symbol whereby that symbol will be printed instead of leaving a space between two adjacent words in the code message.

(i) Claim 49 includes recording both the language and the code message and also means to equalize the force of the type bars. As above pointed out, there is no means to equalize the force of the type bars, but merely a modification of a type bar actuating mechanism.

(j) Claims 50, 51 and 52 include the recording of both the language message and the code message on a tape.

(k) Claim 61 specifies the printing a code symbol in the space between two adjacent English words.

(l) Claim 37 specifies a master switch and an individual switch operated by any key.

*Filed
21 May '46* ← 5. Korn 1,705,641, reference (f), has but one claim that is not so limited with details that the device of reference (b) is without its scope. Claim 1 of this patent is of sufficient breadth that it would be infringed by the device of reference (b) if it were valid. However, this claim is clearly readable upon the structure of Hebern 1,683,072, reference (d), and is therefore invalid. *Filed
21 May '46*

6. Korn 1,733,886, reference (g), is not infringed by the device of reference (b) as all the claims include glow lamps for indicating the code character that is being printed as a key is struck.

7. Bernstein 1,777,425, Scherbius 1,556,964; 1,584,660 and 1,657,411, Hagelin 1,846,105, Wahnoe 1,472,775 and Beyer 1,414,496, references (h) to (l) inclusive, show devices so distinct from that of reference (b) that the claims respectively drawn to each are beyond question not infringed.

8. In considering the scope of the claims of the various patents involved in this opinion the lines of distinction between the proposed apparatus and the claims have necessarily been rather finely drawn. Hebern has contributed substantial improvements in the ciphering art and while his claims are limited and are believed not to be infringed, yet there are several points of fact and law that may be urged. Taking the decisions of the courts as a guide, however, it is believed that any decision on the patents involved herein would be in favor of the Government.

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9. The Judge Advocate General is therefore of the opinion in regard to the questions propounded in paragraph seven of the Bureau of Engineering letter of 2 September 1932, reference (a), as follows:

(a) that none of the patents enclosed with reference (a) covers basically the utilization of a rotating drum to change the circuits in a coding and decoding machine, but all merely cover the means whereby such drums are utilized;

(b) that the design described in the Bureau of Engineering design of reference (b), enclosure (F) of reference (a), does not infringe any of the patents enclosed with reference (a);

(c) that the design shown in reference (b) appears to disclose patentable novelty in the cipher drum actuating mechanism;

(d) that the Bureau of Engineering would incur no liability under any of the patents forwarded with reference (a) by building and using the design shown in reference (b).

O. O. Murfin

Approved:

SEP 30 1932

G. F. Adams

Secretary of the Navy.

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