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United States Court of Customs and Patent Appeals.

Application of Peter P. TOMA.

Appeal No. 77-554.

May 18, 1978.

The Patent and Trademark Office Board of Appeals, Serial No. 176,672, sustained rejection of certain claims as directed to nonstatutory subject matter, and applicant appealed. The Court of Customs and Patent Appeals, Baldwin, J., held that: (1) claims which did not involve any direct or indirect recitation of a procedure for solving a mathematical problem but rather concerned translation from source natural language, such as Russian, to a target natural language, such as English, and which in recited steps did not contain mere procedures for solving mathematical problems, did not directly or indirectly recite an algorithm, and thus were not rendered nonstatutory as procedures for solving a given type of mathematical problem, and (2) method for enabling a computer to translate natural languages is in the technological arts.
Reversed.

West Headnotes

[1] Patents k113(4)
291k113(4)

Where notice of appeal from decision of Patent and Trademark Office Board of Appeals sustaining rejection of certain claims as being directed to nonstatutory subject matter contained 16 reasons, six of which expressly referred to fewer than all appealed claims and remaining ten of which contained no express reference to particular claims but focused on Board positions that related to all claims, and Board did not allege that it was misled by notice, notice was sufficient to give Court of Customs and Patent Appeals jurisdiction over all claims that applicant sought to bring before it.

[2] Patents k7.14
291k7.14

[2] Patents k16.4
291k16.4

Even if only novel aspect of invention involving a method of operating a digital computer to translate from a source natural language, such as Russian, to a target natural language, such as English, were an algorithm, it was not proper to decide question of statutory subject matter by focusing on less than all the claimed invention. 35 U.S.C.A. ¤ 101.

[3] Patents k7
291k7

[3] Patents k7.14
291k7.14

Claims, which did not contain any direct or indirect recitation of a procedure for solving a mathematical problem but rather concerned a method of operating a digital computer to translate from a source natural language such as Russian to a target natural language such as English, and which in recited steps did not contain mere procedures for solving mathematical problems, did not directly or indirectly recite an algorithm and thus were not rendered nonstatutory as involving a procedure for solving a given type of mathematical problem. 35 U.S.C.A. ¤ 101.

[4] Patents k7
291k7

Method for enabling a computer to translate natural languages is in the technological arts, i. e., it is a method of operating a machine. 35 U.S.C.A. ¤ 101.

[5] Patents k7
291k7

"Technological" arts inquiry had to focus on whether claimed subject matter, a method of operating a machine to translate, was statutory, not on whether product of claimed subject matter, a translated text, was statutory, not on whether the prior art which the claimed subject matter purported to replace, translation by human mind, was statutory, and not on whether the claimed subject matter was presently perceived to be an improvement over the prior art. 35 U.S.C.A. ¤ 101.

*873 D. Bruce Prout, Christie, Parker & Hale, Pasadena, Cal., attorneys of record, for appellant; Peter G. Mack, Bacon & Thomas, Arlington, Va., of counsel.

Joseph F. Nakamura, Washington, D. C., for the Commissioner of Patents; Thomas E. Lynch, Washington, D. C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, Judges.

BALDWIN, Judge.

This appeal is from the decision of the Patent and Trademark Office (PTO) Board of Appeals (board), modified on reconsideration, sustaining the rejection of claims 1-13, 15-24, 26, 28-36, 40, 41 and 43-56 [FN1] under 35 *874 U.S.C. s 101 as being directed to nonstatutory subject matter. We reverse the rejection of all claims.

FN1. In application serial No. 176,672, filed August 31, 1971, for "Method Using a Programmed Digital Computer System for Translation Between Natural Languages."

The Invention

The invention involves a method of operating a digital computer to translate from a source natural language, e. g., Russian, to a target natural language,

e. g., English. The method involves three phases. The dictionary look-up phase establishes the target language meaning of each word in the source text. The syntactical analysis phase identifies syntactical information from the inflection of the word and the position of the word in the source text. The synthesis phase takes the meaning and syntactical information of all of the words of a sentence in the source text and forms a sentence in the target language.

More specifically, the method begins by loading the source text into the memory of a computer. Each source text word is then transformed into a converted source text word. The converted source text word consists of the source text word and coded information. The coded information may include a memory offset address linkage which provides access to a memory location that contains syntactical information and translation for the source text word. The converted source text words which derive from a source text sentence are then synthesized into a target language translation of that sentence. The synthesis correctly establishes both word meaning and word position in the target language sentence.

An important aspect of the invention is the separate treatment given high frequency versus low frequency words. In order to maximize the effective capacity of the core memory of the computer, the low frequency words carry their translation information along with them, while each of the high frequency words carries a memory offset address linkage which allows easy access to its translation information which is stored in the core memory. Thus, the translation information for frequently used words is held in an easily accessible place in the computer rather than along with every occurrence of the word as is done for low frequency words.

While the above description portrays a human analogy of how the claimed invention functions, it must be understood that, in fact, the actual operation of the process by the computer is quite different. From the time that the source text is converted to machine-readable input data until the time that the machine-readable output data is converted to human-readable translation text, the claimed process proceeds under the control of a computer program. While it is convenient to describe the steps of the program as if they were being performed by a human translator, in fact, nothing of the kind is happening. Rather, the computer is carrying out a series of unthinking, abstract mathematical operations on the abstract values stored in the memory of the computer. The program functions independently of the meaning or significance of the data on which it is acting. The fact that the program is formed in a high level programming language, which makes the program appear to give significance to the machine operation, does not change the fact that the machine is actually carrying out a series of abstract steps which have nothing to do with translating between natural languages. If a different kind of information were fed into the computer, the program used in this invention could conceivably perform a function totally different from translating.

Various claims of appellant recite activity by which information is extracted from the computer. Claims 32 and 36 include "printing out the translation." Claim 51 recites the step "converting the target language sequence from computer intelligible binary coded signals back to visual indicia." Claims 52 and 53 limit the "converting" step of claim 51 to "printing." Claim 54 recites the step of "converting the proper target language sequence from computer intelligible binary coded signals back to visual indicia." Claims 55 and 56 limit the "converting" step in claim 54 to "printing."

The following claims are representative:

*875 1. A method for translation between source and target natural languages using a programmable digital computer system, the steps comprising:

(a) storing in a main memory of the computer system a source text to be translated;
(b) scanning and comparing such stored source text words with dictionaries of source language words stored in a memory and for each such source text word for which a match is found, storing in a file in main memory each word and in association with each such word, coded information derived from such dictionary for use in translation of such word, the coded information including memory offset address linkages to a memory in the computer system where grammar and target language translations for the word are stored;
(c) analyzing the source text words in its file of words, a complete sentence at a time, and converting the same into a sentence in the target language utilizing the coded information and including the steps of
(1) utilizing the memory offset address linkages for obtaining the target (sic language) translations of words from a memory; and
(2) reordering the target language translation into the proper target language sequence.
32. A method, according to claim 1, including the steps of analyzing a sequence of words in the source language within phrases and clauses in relation to the target language word sequence, the target language word sequence being expressed symbolically by assigned numbers and printing out the translation taking into consideration each source word.
51. A method for translation between source and target natural languages using a programmable digital computer system, the steps comprising:
(a) converting a source text to be translated from visual indicia to computer intelligible binary coded signals;
(b) storing in a main memory of the computer system the converted source text to be translated;
(c) scanning and comparing such converted source text words with dictionaries of source language words stored in a memory and for each source text word for which a match is found, storing in a file in main memory each word and (sic in) association with each such word, coded information derived from such dictionary for use in translation of such word, the coded information including memory offset address linkages to a memory in the computer system where grammar and target language translations for the word are stored;
(d) analyzing the converted source text words in the file of words, a complete sentence at a time, and converting the same into a sentence in the target language utilizing the coded information and including the steps of
(1) utilizing the memory offset address linkages for obtaining the target language translations of words from a memory; and
(2) reordering the target language translation into the proper target language sequence;
(e) converting the target language sequence from computer intelligible binary coded signals back to visual indicia.
52. The method of claim 51 wherein the last step of converting comprises the step of printing.
The Board

The opinion of the board states that the claimed method is not statutory subject matter under 35 U.S.C. s 101.[FN2] The board's position is based on its reading of Gottschalk v. Benson, 409 U.S. 63, 93 S.Ct. 253, 34 L.Ed.2d 273, 175 USPQ 673 (1972), and its *876 reading of our early interpretation of Benson in In re Christensen, 478 F.2d 1392, 178 USPQ 35 (Cust. & Pat.App.1973). Appellant's claimed invention is, according to the board, an algorithm or rule having no substantial practical application except in connection with a digital computer. The board quoted Benson for the proposition that such inventions are not patentable subject matter.[FN3] Though the board did recognize that appellant's algorithm is far more complex

than which was examined in Benson, the board found that Benson expressed no limitations on the nature, extent, or complexity of unpatentable algorithms.

FN2. 35 U.S.C. s 101 provides:
Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

FN3. The board cited the "nutshell" holding in Benson :
It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula for converting binary code to pure binary numerals were patented in this case. The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself." (409 U.S. at 71-72, 93 S.Ct. at 257, 175 USPQ at 676.)

On reconsideration, the board considered a very broad, dictionary definition of "algorithm" [FN4] and concluded that the term is not limited to expressions in mathematical terms but rather includes expressions in natural language. The board argued that the apparent absence of any mathematical notation or activity in appellant's claims did not distinguish appellant's claims from the subject matter in Benson.

FN4. The board took the following definition from C. Sippl and C. Sippl, Computer Dictionary and Handbook 23 (2d ed. 1972):
algorithm 1. A fixed step-by-step procedure for accomplishing a given result; usually a simplified procedure for solving a complex problem, also a full statement of a finite number of steps. 2. A defined process or set of rules that leads and assures development of a desired output from a given input. A sequence of formulas and/or algebraic/logical steps to calculate or determine a given task; processing rules.

The board also cited Christensen in support of its application of Benson to this case.[FN5] The only difference the board found between the prior art computer translation method, Oettinger,[FN6] and the claimed invention was a novel algorithm. The board read Christensen for the proposition that such a difference is not sufficient to render a process statutory.

FN5. The board focused on the following passage in Christensen :
The issue before us in the instant case is also a narrow one, namely, is a method claim in which the point of novelty is a mathematical equation to be solved as the final step of the method, a statutory method? We follow the Supreme Court in concluding that the answer is in the negative. (478 F.2d at 1394, 178 USPQ at 37.)

FN6. A. Oettinger, Automatic Language Translation (Harvard Monographs in Applied Science No. 8 1960). Oettinger describes a computer-based dictionary which forms a literal, word-for-word translation.

OPINION

[1] We must begin by resolving the question whether appellant's Notice of Appeal was sufficient to give us jurisdiction over all of the claims which appellant is trying to bring before us. Appellant's Notice of Appeal

contained sixteen reasons. Six of the reasons expressly refer to fewer than all of the appealed claims. The remainder of the reasons contain no express reference to particular claims and focus on board positions that relate to all of the claims. The PTO does not allege that it was misled by the Notice. Therefore, we hold that this Notice of Appeal is sufficient to give us jurisdiction over all of the claims which appellant has attempted to bring before us. In re Schwarze, 536 F.2d 1373, 190 USPQ 294 (Cust. & Pat.App.1976).

[2] We reject the board's analysis based on Christensen. Even if the only novel aspect of this invention were an algorithm, it is not proper to decide the question of statutory subject matter by focusing on less than all of the claimed invention. In re Chatfield, 545 F.2d 152, 191 USPQ 730 (Cust. & Pat.App.1976), cert. denied, --- U.S. ----, 98 S.Ct. 226, 54 L.Ed.2d 155, 195 USPQ 465 (1977).

*877 Next, we expressly recognize some questions which are not at issue in this case. The examiner and the board do not now directly question whether appellant has invented, properly claimed, and adequately disclosed a computerized method for translating between natural languages. Nor is it directly questioned whether the method is new, useful, and unobvious. The single ground of rejection articulated by the board is that the Benson holding renders the method unpatentable.

[3] Thus, the main issue in this case is whether the claims on appeal are rendered nonstatutory by the holding in Benson.

In the process of our search for the meaning of Benson, we have defined certain classes of claims which are clearly not rendered nonstatutory by Benson. One such class covers those claims which do not directly or indirectly recite a Benson -type algorithm. In re Freeman, 573 F.2d 1237, 197 USPQ 464 (Cust. & Pat.App.1978).

In applying the Freeman rationale to the case before us, we begin by rejecting the board's definition of algorithm recited in note 4, supra. While we agree with the board that the form in which an "algorithm" is recited, whether algebraic or prose, is of no moment, it is clear to us that the Benson Court used the term "algorithm" in a specific sense, namely "a procedure for solving a given type of mathematical problem." 409 U.S. at 65, 93 S.Ct. at 254, 175 USPQ at 674 (emphasis added). Using this definition, we have carefully examined the claims in this case and are unable to find any direct or indirect recitation of a procedure for solving a mathematical problem.[FN7] Translating between natural languages is not a mathematical problem as we understand the term to have been used in Benson. Nor are any of the recited steps in the claims mere procedures for solving mathematical problems. Since the claims do not directly or indirectly recite an algorithm, the claims cannot preempt an algorithm. We hold, therefore, that the claims in this appeal are not rendered nonstatutory by Benson.

FN7. We do not consider the question whether the mere recitation of a step involving computer activity, but not otherwise reciting an algorithm, "indirectly recites" an algorithm. That issue was neither considered by the board nor argued before us. Furthermore, the question involves factual inquiries which an appellate court is ill-equipped to accomplish.

There is another issue in this case. The examiner, in his Final Rejection and in his Examiner's Answer, appears to have rejected the claims because a computerized method of translating is not, the examiner submitted, in the "technological arts." The examiner cited In re Musgrave, 431 F.2d 882, 57 CCPA 1352, 167 USPQ 280 (1970); In re Benson, 441 F.2d 682, 58 CCPA 1134, 169 USPQ 548 (1971), rev'd sub nom., Gottschalk v. Benson, 409 U.S. 63, 93 S.Ct. 253, 34 L.Ed.2d 273, 175 USPQ 673 (1972); In re McIlroy, 442 F.2d 1397, 58

CCPA 1249, 170 USPQ 31 (1971), for the proposition that all statutory subject matter must be in the "technological" or "useful" arts, and that, as far as computer-related inventions are concerned, only those inventions which "enhance the internal operation of the digital computer" are in the "technological" or "useful" arts. The examiner further stated that natural language translation is a "liberal art" and that effecting the translation by means of a machine does not transform the activity into a "technological art." The board's perfunctory treatment of this theory of rejection did not indicate approval or disapproval of it.

[4][5] First, we hold that the method for enabling a computer to translate natural languages is in the technological arts, i. e., it is a method of operating a machine.[FN8] The "technological" or "useful" arts inquiry must focus on whether the claimed subject matter (a method of operating a machine to translate) is statutory, not on whether the product of the claimed subject matter (a translated text) is statutory, not on whether the prior art which the claimed subject *878 matter purports to replace (translation by human mind) is statutory, and not on whether the claimed subject matter is presently perceived to be an improvement over the prior art, e. g., whether it "enhances" the operation of a machine. This was the law prior to Benson and was not changed by Benson.

FN8. The question whether all of the claims in this case actually claim a method which accomplishes a translation was not raised below and we do not consider it.

Second, the examiner has taken language from the cited cases and attempted to apply that language in a different context. Musgrave, In re Benson, and McIlroy all involved data processing methods useful in a computer, but not expressly limited to use in a computer. Furthermore, all of those cases involved a "mental steps" rejection. The language which the examiner has quoted was written in answer to "mental steps" rejections and was not intended to create a generalized definition of statutory subject matter. Moreover, it was not intended to form a basis for a new s 101 rejection as the examiner apparently suggests. To the extent that this "technological arts" rejection is before us, independent of the rejection based on Benson, it is also reversed.

The decision of the board is reversed.

REVERSED

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