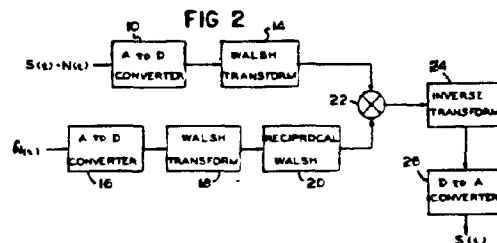


COMMISSIONER'S DECISION

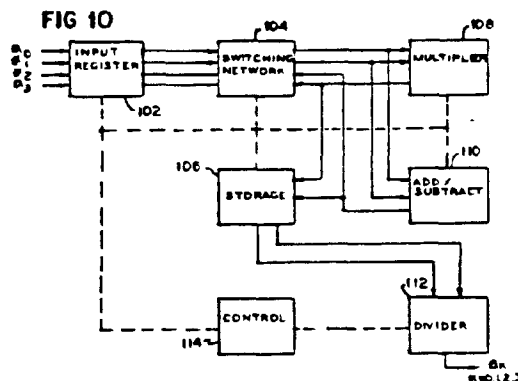
Section 2, Statutory Matter: The disclosure and drawings were considered sufficient to show an assembly of apparatus acceptable under S. 2. The rejected claims were held not to define the combination disclosed. Applicant's new claims, directed to means for signal enhancement including means for generating a reciprocal of a Walsh transform series, were satisfactory.

This decision deals with Applicant's request that the Commissioner of Patents review the Examiner's Final Action on application 224,059 (Class 354-138). The application was filed April 8, 1975, by Batelle Memorial Institute, and is entitled INFORMATION AND PROCESS CONTROL ENHANCEMENT. The inventors are Richard L. Richardson, Bernard P. Hildebrand, and Robert E. Mahan. The Examiner in charge issued a Final Action refusing the application. The Patent Agent informed the Patent Office on January 6, 1984 that a Hearing was not necessary.

The application relates to a system to obtain an enhanced output signal, S_t , from an input waveform signal that has an offensive noise factor, $S_t \cdot N_t$. One example of the system is shown in figure 2, reproduced below. The system provides a waveform noise factor, $\hat{N}_t$, indicative of the offensive noise that is to be extracted, and transforms it and the input waveform $S_t \cdot N_t$ into components in the form of Walsh functions, i.e. into respective series expansions of Walsh functions. In converting $\hat{N}_t$, the signal passes through A to D converter 16 and Walsh transform 18, and then the reciprocal of the $\hat{N}_t$ series is obtained by means of reciprocal Walsh transform 20. That reciprocal is multiplied at 22 with the output from Walsh transform 14, and the disclosure says this multiplication removes the offensive noise. The output from 22 is coupled to inverse transform coupler 24 which drives converter 26. The resulting output S_t represents the enhanced signal.



One example of circuitry for the reciprocal Walsh transform converter 20 is given in figure 10, reproduced below. The individual coefficients produced by a Walsh transform enter storage register 102 and are made available via switching network 104 and control unit 114 to the remainder of the circuit for successive processing at stations 108, 110, and 112, and also to intermediate storage at 106.



In the Final Action the Examiner rejected the disclosure and the claims in view of Section 2 of the Patent Act, and further rejected the claims for not distinguishing statutory from non-statutory subject matter.

In the Final Action, the Examiner says (in part) as follows:

...

The basis of the Examiner's rejection is that the claims encompass the general purpose computer alternative embodiment referred to on page 2 line 7 and disclosed on pages 29 and 30. This is not to say that the applicant may not patent other statutory subject matter which may also be disclosed.

...

An analysis of all the apparatus claims indicates a combination of means plus function in the environment of control filtering, signal enhancement or information transferring circuitry or apparatus. However, it is considered that they do not clearly define an inventive step as required by law, since apart from the novel algorithm disclosed all other apparatus is old in the art.

...

In his response the Applicant argues (in part) as follows:

Applicant's invention consists neither of a special purpose computer nor a general purpose computer. Rather, an apparatus is disclosed which processes digitized signals. The fact that many or most of the components of the apparatus could comprise digital computer devices, or indeed that their functions could be performed on one computer device with the exception of the A to D and D to A converters, does not render the invention unpatentable. The preferred form of the device does not comprise a single computer, although a certain portion thereof, specifically the reciprocal Walsh transform device, preferably embodies a computing device. It should be emphasized Applicant claims an apparatus for processing signals and not a method of calculation to produce mathematical results.

...

It is submitted the present invention fits in the category of an apparatus which utilizes a mathematical algorithm in a useful way, and in a way not heretofore known, to produce new and highly desirable results.

...

The issue before the Board is whether or not the disclosure and the rejected claims are directed to patentable subject matter under Section 2 of the Act.

Rejected claim 1 reads:

Apparatus for combining a pair of inputs, said apparatus including means for representing each input as a series expansion of square wave components, means for generating the reciprocal of one said series expansion of square wave components as a third series of square wave components, and means for combining said third series of square wave components with the remaining series expansion of square wave components to provide an output.

We note that the Examiner in maintaining his rejection under Section 2 of the Patent Act, has commented about the sufficiency of the disclosure. It appears that he has done so in an effort to resolve the issue of whether or not the disclosure is directed to subject matter that is statutory. We bear this in mind as we consider the rejection under Section 2.

In answer to the Examiner's question concerning whether an invention has been made, Applicant points out in his response that the components in the block diagrams, "such as the A to D converters, multipliers, D to A converters, and the like..." are readily available. He also says that the components "...such as the Walsh transform, inverse transform, and reciprocal Walsh transform..." are set forth in figures 6, 7, 8 and 9. In commenting about the reciprocal Walsh transform device, he contends that figure 10 suitably shows a means illustrating the reciprocal transform device. He also says the control elements sequence the events in a straightforward manner. To support this contention he refers to the passage on page 29 lines 17 to 20. As evidence of a further example, he also refers to the apparatus and the operation performed thereby, as given on page 29 from line 29 through to line 16 of page 30. Applicant continues his explanation by referring to the implementation of the Crout routine as referred to on page 30 wherein this routine is given. Applicant points out also that the use of a computing device does not detract from the overall combination.

In considering the issue as developed by the Examiner and as argued by the Applicant, we are guided by the Federal Court decision in Schlumberger Canada Ltd. v The Commissioner of Patents 56 CPR (2d) at 204 (1981). Being handed down in 1981, the decision was not, of course, available to assist either the Examiner or the Applicant when the Final Action was taken. In that decision involving computer-related subject matter, Pratte J. had these comments:

In order to determine whether the application discloses a patentable invention, it is first necessary to determine what, according to the application, has been discovered.

and

I am of opinion that the fact that a computer is or should be used to implement discovery does not change the nature of that discovery

We learn from Applicant's disclosure that a reciprocal Walsh function may be obtained. He has shown a means in an assembly of apparatus which makes use of his discovery and carries out what he says had not been possible to do prior to his disclosure. It may well be that calculations were used, however, that does not negate the fact that this application shows the means in an assembly which attains Applicant's discovery. It is our view that Applicant's disclosure of apparatus amounts to more than merely making calculations. We are satisfied that Applicant's discovery amounts to the embodiment of an idea in a means to carry it out. We find in this application that the subject matter may be considered as residing within Section 2 of the Patent Act. However, all the rejected claims are not acceptable because they do not adequately define the combination of the means in the assembly, and therefore they should be refused.

In an attempt to overcome the rejection, the Applicant submitted new claims after the Final Action, of which new claim 1 reads:

Apparatus for signal enhancement comprising:
means for spectrally decomposing at least a portion of an input signal into a series expansion of Walsh function representations, said spectrally decomposing means including an analog-to-digital converter for sampling said input signal and for digitizing the samples produced, said spectrally decomposing means further including a Walsh transform converter for receiving said digitized samples and providing an array of Walsh coefficients constituting the amplitudes of Walsh functions together representing said portion of said input signal;

second means for spectrally decomposing at least a portion of a second input function into a second series expansion of Walsh function representations, said second spectrally decomposing means including a Walsh transform converter for providing an array of Walsh coefficients constituting the amplitudes of Walsh functions together representing said portion of said second input function;

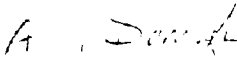
means for generating the reciprocal of one of said Walsh function series expansions in the form of coefficients of a reciprocal Walsh series expansion;

and a multiplier for multiplying said reciprocal with the other of said Walsh function representations.

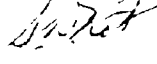
We see in the apparatus in new claim 1 that a means for signal enhancement has been set forth, as described in the disclosure and shown in figures 6 to 10, including the means for generating the reciprocal of one of the Walsh function series expansions. In our view, new claim 1 is directed to an apparatus for producing an enhanced signal, and represents a proper combination of means. We are satisfied therefore that the amended claims define more than mere calculations and more than an algorithm, and that they are properly directed to Applicant's discovery.

In summary we are satisfied that the rejection of the disclosure under Section 2 of the Act may not be supported. We are not satisfied however that the rejected claims define an acceptable combination. In our opinion the new claims are directed to more than mere calculations, and in the absence of any cited art, may be acceptable.

We recommend that the rejection of the disclosure under Section 2 of the Act be withdrawn, and that the new claims be accepted.


A. McDonough
Chairman
Patent Appeal Board


M.G. Brown
Assistant Chairman


S.D. Kot
Member

I concur in the findings and the recommendation of the Patent Appeal Board. Accordingly, I withdraw the Final Action, and I direct that prosecution should proceed on the basis of the new claims.


J.H.A. Gariépy
Commissioner of Patents

Dated at Hull, Quebec
this 1st. day of March, 1984

Agent for Applicant

Smart & Biggar
Box 2999, Stn. D
Ottawa, Ont.