COMMISSIONER'S DECISION

NON STATUTORY; SEC. 2 - RELEASING A DEAD LOCK STATE IN DATA PROCESSING

A system for releasing a dead lock state during data processing utilizing several components interacting to release one task from a resource and permitting another task to use that resource is not an algorithm.

Final Action: Reversed

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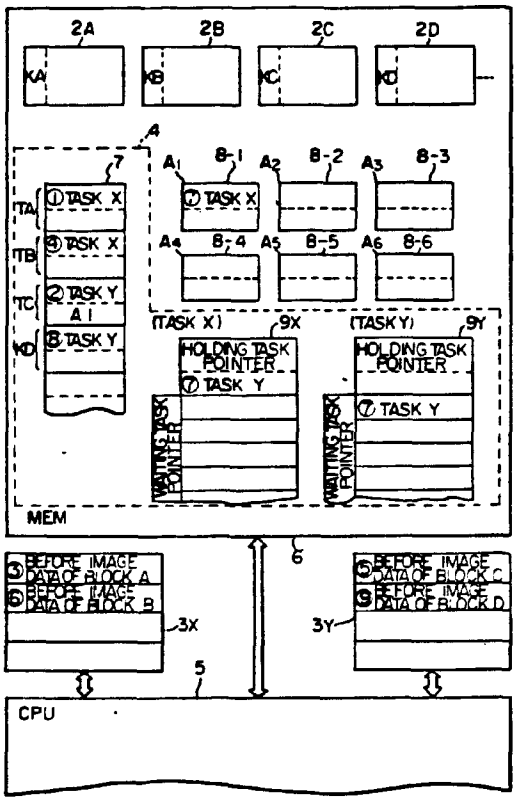
This decision deals with Applicant's request that the Commissioner of Patents review the Examiner's Final Action on application 310,026 (Class 354-230.8). The application was filed August 24, 1978, by Fujitsu Ltd. and is entitled SYSTEM FOR AUTOMATICALLY RELEASING A DEAD LOCK STATE IN A DATA PROCESSING SYSTEM. The inventor is R. Kikuchi. The Examiner in charge issued a Final Action refusing the application.

The application relates to releasing a dead lock state in a data processing system wherein a plurality of tasks compete for the use of a plurality of resources. In figure 3 reproduced below, a dead lock exists when a task X which is using resource 2A also has to occupy resource 2B but cannot because resource 2B is occupied by task Y, and when task Y has to use resource 2A but cannot because 2A is occupied by task X. Processing is thereby held up. To remove dead lock, task X is withdrawn from 2A and another resource 2C is made available to it. This may be achieved, should 2C be occupied by a task, by data buffer 3Y restoring the previous contents to 2C, and by releasing from 2C whatever task may have been there. Task X as stored in queue table 8-1 is transferred to key TC and then to resource 2C. Then task Y is able to use resource 2A. The processing of task X using 2A is thus delayed, but the processing system continues operation.

Fig. 3



In the Final Action, the Examiner poses the question "...where does the novelty lie?" and provides two observations, it "...lies in an algorithm or program rather than apparatus", and it "...lies in the information stored in the memory (i.e. the key table and the registration tables)". He criticizes the disclosure for not containing novel apparatus, however, he concedes the claims are directed to a system.

In making his case that patentable matter is present in the application, the Applicant said in his response (in part) as follows:

> ...
>
> That which the Applicants regard as their invention is not the information stored in memory, as suggested by the Examiner, but the combination of two specific data storage devices with an examining means and a releasing means interrelated in the manner set forth in claim 1. The particular data which may be stored in the storage devices is immaterial to the invention.
>
> ...

> In the embodiment of Figure 3, the buffers are separate and discrete components electronically connected to the central processing unit 5. In the same manner, the waiting task control table 4 could be a discrete, separate electrical component electrically connected to the central processing unit.
>
> ...

The issue before the Board is whether or not the application presents patentable subject matter in view of Section 2 of the Act.

Claim 1 reads:

> 1. A system for automatically releasing a dead lock state in a data processing system, wherein a plurality of tasks including a first task and other tasks commonly use a plurality of resources, comprising:
>
> a waiting task control table storing means, one for each given task, for storing information corresponding to said each given task in a waiting state due to occupation of a certain one of said resources by a certain one of said other tasks, and
>
> a storing before image data buffer means, one for each given task, for storing before image data every time the content of one of said resources is modified by said each given task, and
>
> said system including examining means, operatively connected to said waiting task control table storing means, responsive to said each given task in the waiting state for examining the waiting states of the other tasks in accordance with the contents of said waiting task control table storing means corresponding thereto, said examining means judging whether or not the waiting state of said other tasks is due to the occupation of said resource by said each given task, and
>
> said system including releasing means responsive to said waiting state of said other tasks due to occupation of said resource by said each given task for releasing the occupation of said resource by said each given task, wherein the processing of said other tasks in accordance with the content of said before image data buffer means occurs prior to processing said first task.

In reviewing the prosecution, we find it useful to refer to statements in Schlumberger Canada Ltd. v The Commissioner of Patents 56 CPR at 204 (1981). In that decision involving computer-related subject matter, Pratte J. made 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

In his arguments, Applicant says that his structure is an assembly of interacting parts which function to determine when a dead lock state occurs, and also coact to release that state and permit the data processing system to continue. The system contains resources, tasks which use the resources, and data buffers used at certain times during the process to store before image data from the resources. He says that figure 3 shows that the before image data buffers are separate and discrete components, and form no part of the main memory nor of the central processing unit. In the application he relates how these elements function with the other elements such as the key table, the holding queue table, and the registration table for tasks, to detect and note when the resource elements are in use and by what task, and he then describes how to release from a resource a task that is forming part of a dead lock state, and to set it aside for later processing. Applicant further argues that the task registration table, and the key means and the queue table forming part of the examining means, such as found in claims 1 to 11, relate to a patentable advance in the apparatus itself. It is clear that Applicant has described the various steps in carrying out his discovery, and we see also that he has provided an assembly of elements to achieve a release of a dead lock state in a processing system. We are satisfied that Applicant's discovery presents an arrangement of computing apparatus which falls within the confines of Section 2 of the Act.

Turning to the claims, we note the Examiner has acknowledged they are directed to a system, and commented he was not suggesting they were directed to an algorithm. Accordingly, bearing in mind no prior art has been cited, and having determined the subject matter to be acceptable in view of Section 2, we find no reason not to accept the claims for being directed to Applicant's system.

In summary, keeping in mind the guidance given by the Schlumberger decision, we have reviewed the application to determine Applicant's discovery. At the same time we have given careful consideration to the objections made in the Final Action and to Applicant's submission. We find Applicant's system is for releasing a dead lock state during data processing and includes several components interacting to release one task from a resource and permit another task to use that resource. We do not find the subject matter to be a program or an algorithm. Further, we are persuaded that Applicant's arguments have properly addressed the issue and have overcome the Examiner's objections. We are satisfied therefore the application falls within the ambit of Section 2.

In view of the above findings, we believe a Hearing would be unnecessary. We recommend the rejection of the application be withdrawn and the application returned to the Examiner for continued prosecution.

A. McDonough
Chairman
Patent Appeal Board

M.G. Brown
Assistant Chairman

S. D. Kot
Member

I concur with the findings and the recommendation of the Patent Appeal Board. Accordingly, I withdraw the Final Action and return the application for prosecution consistent with the recommendation.

J.H.A. Gariépy
Commissioner of Patents

Dated at Hull, Quebec
this 6th. day of May, 1985

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