

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 38

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MASAHIKO KURAKADO, ATSUKI MATSUMURA
and TOORU TAKAHASHI

Appeal No. 95-4799
Application 07/996,516¹

ON BRIEF

Before HAIRSTON, KRASS and CARMICHAEL, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

¹Application for patent filed December 23, 1992. According to appellants, the application is a continuation of Application 07/673,063, filed March 22, 1991, now abandoned.

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This is a decision on appeal from the final rejection of claims 11, 12, 16 and 17. Claims 1 through 10 have been cancelled. The examiner has withdrawn the final rejection of claims 13 through 15 and 18 through 20, indicating them to be allowable.

The invention is directed to a radiation detector employing superconductors rather than the semiconductors employed in prior art detection devices. The problem with superconductors, i.e., that increasing surface area for more efficient detection operation causes a decrease in detection signal quality due to an increase in capacitance of the tunnel junction, is said to be solved by the invention by providing an optimal number of series-connected superconducting tunnel junctions for a particular detector. The number of these tunnel junctions is said to be optimal for a fixed area of the detector when certain relationships between the total area of the superconducting tunnel junctions and the capacitance per unit area of the superconducting tunnel junctions are established.

Representative independent claim 11 is reproduced as follows:

11. A radiation detection device comprising:

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a series connection of N superconducting tunnel junctions;

wherein N is an integer which is greater than the larger of A and B, and which is less than the larger of C and D;

wherein $A=3$

$$B=0.05(SC_0/(20 \times 10^{-12}F))^{0.5},$$

$$C=20(SC_0/(5 \times 10^{-12}F))^{0.5}, \text{ and}$$

$$D=10SC_0/(5 \times 10^{-12}F);$$

wherein F denotes farads, S denotes a total area of said N superconducting tunnel junctions in cm^2 , and C_0 denotes an electric capacitance per unit area of said N superconducting tunnel junctions in F/cm^2 .

The examiner relies on the following references:

Irwin et al. (Irwin), "Planar Antenna-Coupled SIS Devices For Detection And Mixing," Sixth International Conference On Infrared And Millimeter Waves, December 7-12, 1981, pp. 35-36.

Ishibashi et al. (Ishibashi), "Possible Use Of Bulk Superconductor With Tunnel Junctions For Nuclear Radiation Spectroscopy," Nuclear Instruments and Methods in Physics Research, Vol. 227, No. 3, December 1, 1984, pp. 483-488.

Claims 11 and 12 stand rejected under 35 U.S.C. 102(b) as anticipated by either one of Ishibashi or Irwin. Claims 16 and 17 stand rejected under 35 U.S.C. 103 as unpatentable over either one of Ishibashi or Irwin.

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Reference is made to the briefs and answer for the respective details of the positions of appellants and the examiner.

OPINION

We reverse.

With regard to Ishibashi, the examiner contends that Figures 3(a) and (b) of that reference disclose a series-connection of 4 superconducting tunnel junctions for reasons set forth at pages 7-9 of the answer which we incorporate herein. For their part, appellants contend that these Figures of Ishibashi disclose that the connection is a parallel, and not a series, one, for reasons set forth at pages 1-3 of the reply brief, and which we incorporate herein.²

While both appellants and the examiner appear to set forth cogent reasons for their respective positions as to whether the connection is parallel or serial, Ishibashi is simply not clear as to the particular connection. Therefore, we would need to resort to some speculation in determining what is the true type of connection. A rejection under 35 U.S.C. 102(b) may not rely on speculation. Accordingly, we will not sustain the

²We note that in the reply brief, appellants refer to "attached Exhibit A" and "attached Exhibit C." However, we have found no such Exhibits of record.

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rejection of claims 11 and 12 under 35 U.S.C. 102(b) in view of Ishibashi.

With regard to Irwin, the examiner points to the circuit layout of Irwin's Figure 1 for support of an anticipation rejection against claims 11 and 12. While it is clear that Irwin is directed to a detector comprising four series-connected tunnel junctions [see the left-hand column of the top page of the reference], it is not apparent to us that Irwin is directed to "superconducting" tunnel junctions, as claimed, although appellants do not appear to argue this point.

More importantly, in our view, is the specifically recited relationship, in independent claims 11 and 16, between the number of tunnel junctions, N , and values A , B , C and D , where $A=3$ and the other values depend on total area of the N superconducting tunnel junctions and capacitance per unit area of the N superconducting tunnel junctions. Claims 11 and 16 set forth a specific relationship between these values and, in our view, the examiner has never adequately addressed these claim limitations.

The examiner comes to grips with these relational claim limitations, at pages 10-11 of the answer, by curtly dismissing the claimed expressions as defining an integer greater than 3 and

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less than some number. However, the claims do not merely recite "some number." Rather, that number must be as set forth in the claimed relationship, i.e., N is greater than the larger of either 3 or B, where B is proportional to a product of total area of the tunnel junctions and the capacitance per unit area of the tunnel junctions. Also, N must be less than the larger of C and D where C and D are also defined as being proportional to the product of the total area and capacitance per unit area of the tunnel junctions.

Thus, even if Ishibashi is considered to disclose 4 series-connected superconducting tunnel junctions, depending on the values of the total area and capacitance per unit area of the tunnel junctions, Ishibashi may or may not anticipate the claimed subject matter because, depending on these values, $N=4$ may not meet the claimed limitations. Similarly, with regard to Irwin, this reference does not indicate any relationship, as claimed, between the number N of tunnel junctions and the total area and capacitance per unit area of the tunnel junctions.

Further, not only do Ishibashi and/or Irwin not anticipate the subject matter of claim 11 under 35 U.S.C. 102(b), but we find nothing in either of those references which would have suggested the subject matter of claim 16, i.e., the

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relationship between N, A, B, C and D, within the meaning of 35
U.S.C. 103. Dependent claims 12 and 17 stand with their
independent claims.

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The examiner's decision rejecting claims 11 and 12 under 35 U.S.C. 102(b) and claims 16 and 17 under 35 U.S.C. 103 is reversed.

REVERSED

KENNETH W. HAIRSTON)	
Administrative Patent Judge)	
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ERROL A. KRASS)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
)	
)	
JAMES T. CARMICHAEL)	
Administrative Patent Judge)	

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