

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KAZUHIRO KURATA,
HAJIME NAKAMURA and HIROSHI TOMIDA

Appeal No. 1998-0411
Application No. 08/050,078

HEARD: March 06, 2001

Before KIMLIN, KRATZ, and TIMM, Administrative Patent Judges.
KRATZ, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 4-6, which are all of the claims pending in this application.

Appellants' invention relates to a method and apparatus for forming multiple layers on a substrate by epitaxial growth. An understanding of the invention can be derived from a reading of appealed claim 4, which is reproduced below.

4. In a process for producing a multi-layered epitaxially grown crystal comprising a substrate with multiple layers

grown on at least one surface thereof, which process comprises:

arranging a plurality of spaced apart crystalline substrates facing each other at intervals with said surface disposed in a substantially vertical direction;

successively disposing melts for each of said multiple layers into the intervals between the adjacent crystalline substrates and;

performing a liquid-phase epitaxial growth of each of said layers successively on the surface of each substrate,

the improvement comprising the steps of:

vertically aligning and spacing said crystalline substrates in a concave portion of a central upper member of a substantially cylindrical crystalline substrate holder having a central axis and having a shaft adapted for rotation extending downwardly therefrom;

providing fresh melt receptacles and used melt receptacles respectively, for each of said layers, above and below, respectively, said cylindrical crystalline substrate holder, wherein each of said fresh melt and used melt receptacles are stationarily connected to an outside member in rotational relationship to said substrate holder, wherein a multiplicity of fresh melt and used melt reservoirs, respectively, are arranged in said receptacles, respectively, radially about said central axis;

rotating said cylindrical crystalline substrate holder, relative to said outside member and to said receptacles, through a series of angular intervals sufficient to successively align a pair of fresh melt and used melt reservoirs, respectively, with a vertically disposed substrate surface;

successively supplying melts corresponding to said layers into the intervals between and into effective contact with the surfaces of adjacent crystalline substrates from said fresh melt reservoirs; and

successively discharging excess of the melts from said intervals into said used melt reservoir.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

| | | |
|--------------------|-----------|---------------|
| Unno et al. (Unno) | 3,765,959 | Oct. 16, 1973 |
|--------------------|-----------|---------------|

| | | |
|----------|------------------------|----------------------------|
| Murakami | JP Kokai No. 61-135116 | June 23, 1986 ¹ |
|----------|------------------------|----------------------------|

Claims 4-6 stand rejected under 35 U.S.C. § 103 as being unpatentable over Unno in view of Murakami.

OPINION

Upon careful consideration of appellants' specification and the claims on appeal, the evidence of obviousness relied upon by the examiner, and the opposing arguments presented by appellants and the examiner, we find that the aforementioned §

¹ All references to Murakami in this decision are to the English language translation prepared by Schreiber Translations, Inc., of record. We note that our reference to the Schreiber translation in this decision rather than the other translation of record submitted by appellants (attachment to reply brief) has no bearing on the outcome of this appeal.

103 rejection is not well founded. Accordingly, we will not sustain the examiner's rejection.

We point out that in a rejection under 35 U.S.C. § 103, it is fundamental that all elements recited in each claim must be considered and given appropriate effect by the examiner in judging the patentability of that claim against the prior art.

See In re Geerdes, 491 F.2d 1260, 1262-63, 180 USPQ 789, 791 (CCPA 1974). Here, the examiner's rejection set forth in the answer fails to meet that basic test for the presentation of a sustainable § 103 rejection.

For example, with regard to the process of claim 4 and the apparatus of claim 5, the examiner has not reasonably established how Unno together with Murakami would have reasonably taught or suggested: (1) vertical and spaced alignment of multiple substrates in a holder cavity, (2) the provision of used melt receptacles having a plurality of used melt reservoirs located below the holder, and (3) the steps or means for rotating the holder relative to the fixed receptacles to not only successively cause the supply of melt from one of the fresh melt reservoirs for contact with the

surfaces of substrates but to also successively discharge excess melt into one of the used melt reservoirs in the context of the process and apparatus, as respectively set forth in those claims.

Indeed, Unno discloses a horizontally disposed radially offset substrate (19) in a non-rotating holder in figure 2 and the examiner has not pointed out where Unno describes the use or need for any used melt receptacle let alone a used melt receptacle having multiple reservoirs and disposed as required in appellants' claims 4 and 5. Nor does the examiner adequately explain how the herein claimed subject matter would have been suggested to one of ordinary skill in the art by Unno taken together with the non-rotating holder prior art arrangement depicted in figure 2 of Murakami or the disparate rotating holder arrangement of figure 1 of that reference. We note that the figure 1 rotating holder arrangement of Murakami employs horizontally aligned substrates (25) and an effluent receptacle (24) that does not include multiple reservoirs for used melt. Such disclosure hardly suggests a modification of Unno that would result in the herein claimed invention.

As evident by a review of claim 6, the recited apparatus is required to include, inter alia:

a cap attached onto the upper surface of said fresh melt receptacle, having half-notched shaft means extending downwardly therefrom,

a cover attached onto the upper surface of said crystalline substrate holder, having half-notched shaft means extending upwardly therefrom, and

an axially disposed hole at the central part of said fresh melt receptacle, for receiving said half-notched shaft of the cap downwardly thereinto and said half-notched shaft of the cover upwardly thereinto,

The examiner's bald assertions that "[i]t is well known in the art to cover LPE melts so as to prevent loss of materials from the melt" and "[f]urther, the prior art does teach a means to allow opening and closing of the melts" (answer, pages 6 and 7) do not come close to establishing the obviousness, within the meaning of 35 U.S.C. § 103, of the above-noted limitations of claim 6, let alone the subject matter as a whole of that claim.

Consequently, we are in agreement with appellants' conclusion that the examiner has not set forth a prima facie case of obviousness. See, e.g., pages 12-18 of appellants' brief.

The decision of the examiner to reject claims 4-6 under 35 U.S.C. § 103 as being unpatentable over Unno in view of Murakami is reversed.

REVERSED

| | | |
|-----------------------------|---|-----------------|
| Edward C. Kimlin |) | |
| Administrative Patent Judge |) | |
| |) | |
| |) | |
| |) | |
| |) | BOARD OF PATENT |
| Peter F. Kratz |) | APPEALS |
| Administrative Patent Judge |) | AND |
| |) | INTERFERENCES |
| |) | |
| |) | |
| Catherine Timm |) | |
| Administrative Patent Judge |) | |

Appeal No. 1998-0411
Application No. 08/050,078

Page 8

Nikaido, Marmelstein, Murray & Oram
Metropolitan Square
655 15th Street, N.W.
Suite 330 G Street Lobby
Washington, DC 20005-5701

PFK/cam