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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEVEN M. PENN, DAVID N. JONES and MICHAEL E. EMBREE

Appeal No. 1997-0068
Application 07/923,278[1]

HEARD: February 7, 2000

Before COHEN, McQUADE and GONZALES, Administrative Patent Judges.

McQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Steven M. Penn et al. appeal from the final rejection of claims 24 through 43, all of the claims pending in the

[1] Application for patent filed July 31, 1992. According to appellants, the application is a continuation-in-part of Application 07/905,069, filed June 24, 1992, now U.S. Patent No. 5,260,009, issued November 9, 1993; which is continuation of Application 07/648,081, filed January 31, 1991, now abandoned.

application. We affirm-in-part.

The invention relates to "a system . . . for manufacture of three-dimensional objects from computer data using computer-controlled dispensing of multiple media and selective material subtraction" (specification, page 1). A copy of the appealed claims appears in the appendix to the appellants' main brief (Paper No. 16).

The reference relied upon by the examiner as evidence of anticipation and obviousness is:

Pomerantz et al. (Pomerantz) 5,031,120
Jul. 9, 1991
(filed Dec. 22, 1988)

Claims 24 through 26, 28, 30 through 34 and 36 through 43 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Pomerantz.[2]

Claims 27, 29 and 35 stand rejected under 35 U.S.C. § 103 as being unpatentable over Pomerantz.

---

[2] Pomerantz clearly qualifies as prior art with respect to the subject matter on appeal under 35 U.S.C. § 102(e). The appellants have not challenged the examiner's implicit determination that this reference also qualifies as prior art under 35 U.S.C. § 102(b).

Reference is made to the appellants' main and reply briefs (Paper Nos. 16 and 19) and to the examiner's answer (Paper No. 17) for the respective positions of the appellants and the examiner with regard to the merits of these rejections.

Pomerantz discloses a CAD-controlled system for the layer-by-layer production of a three-dimensional physical model made of radiation polymerizable resin. The system 500, which is illustrated schematically in Figure 22, includes a mask producing subsystem 502 and a physical model producing subsystem 504. Subsystem 502 produces mask-bearing substrates 514 corresponding to respective layers of the physical model. As described by Pomerantz,

> [i]n the physical model producing subsystem 504, the mask bearing substrate is precisely positioned in operative engagement with an exposure unit 530 . . . .
>
> The three dimensional model is built up layer by layer on a model support surface 534 which can be selectably positioned along the X and Z axes by suitable conventional positioning apparatus 536. Initially the model support surface 534 is located in operative engagement with and under a resin applicator 540 . . . .
>
> Applicator 540 . . . is operative to provide a

> layer 550 of resin onto support surface 534 which layer is of generally uniform thickness, typically 0.15 mm. Following application of a resin layer thereto, the surface 534 is positioned in operative engagement with, and under exposure unit 530, such that the mask [515] formed on substrate 514 lies intermediate the light source and the layer 550 in proximity to layer 550 . . . permitting exposure of the layer 550 through the mask 515 and consequent hardening of the exposed regions of the layer 550. . . .
>
> The mask 515 together with its substrate 514 is returned to the mask producing subsystem 502 for cleaning and preparation of a subsequent mask. . . .
>
> While a subsequent mask is being produced, the model generation process continues: the exposed layer 550 is positioned in operative engagement with a fluid strip generator 560 for removal of unhardened resin from layer 550 . . . .
>
> The thus cleaned layer 550 is then transported into operative engagement with a support material applicator unit 570 . . . [to] provide a support material to fill in those regions in layer 550 from which the unsolidified solidifiable material was removed. Preferably the support material comprises a melted wax . . . .
>
> After application of the melted wax to layer 550, the layer is preferably transported into operative engagement with a cooling unit 580 . . . . The wax [in] layer 550 is cooled by intimate contact with cooled plate 582 in order to solidify it as quickly as possible prior to further processing . . . .
>
> Following solidification of the wax in layer

> 550, the layer is transported into operative engagement with a machining unit 590, typically comprising a conventional multi-blade fly cutter 592 driven by a motor 594 and associated with a dust collection hood 596 and vacuum cleaner 598. Machining unit 590 is operative to trim the top surface of layer 550 to a precise, flat uniform thickness by removing, as appropriate, excessive thicknesses of both the solidified solidifiable material and the solidified support material.
>
> It will be appreciated that the operation of the system for a single layer as described above is repeated multiple times, as the support surface 534 is lowered correspondingly, producing a multilayer built up model having precisely controlled dimensions [column 17, line 50, through column 19, line 7].

Claims 24, 30, 34 and 43, the four independent claims on appeal, stand rejected under 35 U.S.C. § 102(b) as being anticipated by Pomerantz. Anticipation, of course, is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention. RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984).

The appellants contend that the invention recited in

claims 24, 30, 34 and 43 is not anticipated by Pomerantz because Pomerantz does not meet the "first dispenser" limitations in claims 24, 30 and 43 or the "controlled dispensing device" limitations in claim 34. In this regard, claim 24 recites an apparatus for manufacturing three-dimensional objects comprising, inter alia, a first dispenser operable to dispense a layer of a first material on a target surface "at only selected locations of said target surface, said selected locations corresponding to a cross-section of a three-dimensional object"; claim 30 recites an apparatus for producing a three dimensional object comprising, inter alia, a controller for loading first slice data corresponding to a first slice of the object and a first dispenser for dispensing a layer of a first material onto a target surface "at only locations established according to said loaded first slice data"; claim 34 recites a system for manufacturing three-dimensional objects comprising, inter alia, a controlled dispensing device for dispensing a layer of a first material onto a target surface "at only selected locations corresponding to a cross-section of an object to be

manufactured"; and claim 43 recites an apparatus for manufacturing a three-dimensional object comprising, inter alia, a first dispenser for dispensing a layer of a first material on a substantially planar target surface "at selected locations of said substantially planar first target surface, said selected locations corresponding to a first cross-section of an object."

The examiner submits that these dispenser and dispensing device limitations are met by Pomerantz's resin applicator 540.

As indicated above, the Pomerantz resin applicator 540 is operable to dispense a layer of resin onto a target/support surface whereby portions or locations of the resin layer corresponding to a cross-section or slice of the object being manufactured are hardened and portions or locations of the resin layer not corresponding to the cross-section or slice of the object are removed. Hence, the Pomerantz resin applicator 540 does not meet the limitations in claims 24, 30 and 34 requiring the first dispenser or controlled dispensing device to be operable to dispense a layer of first material at "only"

locations corresponding or according to a cross-section or slice of the object. Since the Pomerantz reference also fails to disclose any other structure meeting these limitations, it is not anticipatory with respect to the subject matter recited in claims 24, 30 and 34 or in claims 25, 26, 28, 31 through 33 and 36 through 42 which depend therefrom.

On the other hand, the Pomerantz resin applicator 540 does meet the first dispenser limitations in claim 43. These limitations are broader than the parallel limitations in claims 24, 30 and 34 in that they do not require the first dispenser to be operable to dispense a layer of first material at "only" selected locations of the target surface corresponding to a first cross-section of the object. That the Pomerantz resin applicator 540 also operates to dispense the layer of first material at additional locations of the target surface not corresponding to a first cross-section of the object is not excluded by or otherwise inconsistent with claim 43. Thus, the appellants' argument that Pomerantz is not anticipatory with respect to the subject matter recited in claim 43 is unconvincing.

In light of the foregoing, we shall sustain the standing 35 U.S.C. § 102(b) rejection of 43 as being anticipated by Pomerantz but not the standing 35 U.S.C. § 102(b) rejection of claims 24 through 26, 28, 30 through 34 and 36 through 42 as being anticipated by Pomerantz.[3]

Finally, we shall not sustain the standing 35 U.S.C. § 103 rejection of dependent claims 27, 29 and 35 as being unpatentable over Pomerantz. In addition to not disclosing an apparatus meeting the limitations in parent claims 24 and 34 relating to the first dispenser or controlled dispensing device, Pomerantz would not have suggested such an apparatus to one of ordinary skill in the art. Thus, the examiner's conclusion that the subject matter recited in claims 27, 29 and 35 would have been obvious within the meaning of § 103 is unfounded.

---

[3] We note that claim 43 is inconsistent with the underlying specification to the extent that it defines the second dispenser recited therein as having a planarizing function. In the event of further prosecution, the examiner may wish to consider whether this inconsistency warrants a rejection under the first and/or second paragraphs of 35 U.S.C. § 112. We also note that the two "means" recited in dependent claim 25 appear to be readable on the same planing apparatus structure disclosed in the specification.

In summary, the decision of the examiner to reject claims 24 through 43 is affirmed with respect to claim 43 and reversed with respect to claims 24 through 42.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

IRWIN CHARLES COHEN Administrative Patent Judge	)	
JOHN P. McQUADE Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JOHN F. GONZALES Administrative Patent Judge	)	

JPM/pgg
L. Joy Griebenow
Texas Instruments Incorporated
M/S 219, P.O. Box 655474
Dallas, TX 75265