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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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MICHAEL K. GEORGES and RAJ D. PATEL

Appeal No. 95-1079
Application 08/037,192¹

ON BRIEF

Before GARRIS, WEIFFENBACH and WALTZ, Administrative Patent Judges.

WEIFFENBACH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-23 and 25-49. The only other claim in the application, dependent claim 24, stands allowed.² We affirm.

¹Application for patent filed March 25, 1993.

²Claim 24 is dependent on claim 1. Although the examiner indicated in an advisory action dated December 3, 1993 (Paper No. 7) that this claim was allowed, it should have been objected to because it is dependent upon a

The Claimed Subject Matter

The claims on appeal are directed to a process for preparing a suspension of submicron size polymeric particles for use as powder coatings or in toner compositions. Claims 1 and 35 are illustrative of the claimed subject matter:

1. A process for the preparation of a polymer comprising: effecting bulk polymerization of a mixture comprised of at least one monomer, a free radical polymerization initiator, and a stable free radical agent until from about 10 to about 50 weight percent of the monomer has been polymerized to form a bulk polymerization product; optionally adding additional free radical initiator to said bulk polymerization product; optionally adding a colorant to said bulk polymerization product; dispersing said bulk polymerization product with a high shear mixer into water containing a stabilizing component selected from the group consisting of non-ionic and ionic water soluble polymeric stabilizers to obtain a suspension of particles or droplets comprised of said bulk polymerization product with said particles having an average diameter of from about 0.1 to about 10 microns; and polymerizing the resulting bulk polymerization product suspension in water to form said polymer.

35. A process for the preparation of polymeric particles useful for powder coating which comprises: effecting bulk polymerization of a mixture of at least one monomer, a free radical polymerization initiator, and a stable free radical agent until from about 10 to about 50 weight percent of the monomer has been polymerized; optionally adding additional free radical initiator; optionally adding a colorant; dispersing with a high shear mixer the aforementioned partially

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polymerized product in water containing a stabilizing component to obtain a suspension of particles or droplets with an average diameter of from about 0.1 to about 10 microns; and polymerizing the resulting suspension to form polymeric particles.

The Rejection

The following prior art reference is relied upon by the examiner to support the rejection of the claims:

Mahabadi et al. (Mahabadi) 5,043,404 Aug. 27, 1991

Claims 1-23 and 25-49 stand rejected under 35 U.S.C. § 103 as being unpatentable over Mahabadi.

Opinion

Appellants state that the claims are to be grouped as follows:

Group I: claims 1-23, 25-34 and 41-49.

Group II: claims 35-40.

Accordingly, claims 2-23, 25-33 and 41-49 will stand or fall with claim 1 and claims 36-40 will stand or fall with claim 35. Claim 34 is separately considered infra.

We have carefully considered the respective positions advanced by appellants and the examiner. For the reasons set forth below, we will sustain the examiner's rejection.

Mahabadi discloses a process for the preparation of a suspension of submicron polymeric particles comprising the steps of (a) effecting partial bulk polymerization (10 to about 50%) of a mixture comprising at least one monomer, a free radical polymerization initiator, a crosslinking component and a chain transfer component, (b) dispersing the bulk polymerization product in water with a high shear mixer containing a stabilizing component (e.g. non-ionic or ionic water soluble polymeric stabilizers) to obtain a suspension of particles or droplets having a diameter from about 0.1 to about 5.0 microns; and (c) polymerizing the suspension to complete the conversion of monomer to polymer (col. 3, lines 6-44). The resultant submicron polymeric particles produced by Mahabadi's process are useful as powder coatings or as toner additives (col. 2, lines 27-38).

The prior art reference differs from the claimed subject matter in that Mahabadi does not disclose the use of a stable free radical agent to control molecular weight distribution

properties³ or what appellants term as "polydispersity."⁴ The examiner maintains that Mahabadi's chain transfer component in step (a) is essentially appellants' stable free radical agent because the "stable free radical agent is defined by appellant [sic, appellants] on page 13 of the specification as free radical polymerization inhibitors ..." (answer, page 3). Appellants contend that Mahabadi's chain transfer agents function as polymerization inhibitors, and not as agents to control the molecular weight distribution properties of the polymer.⁵ Appellants argue that

[s]ubstituting the chain transfer agents recited in Mahabadi for the stable free radical agents of the

³According to appellants, these properties include: "extent of monomer to polymer conversion or degree of a polymerization; control of molecular weight and polydispersity of the bulk product; viscosity of the bulk product; temperature profile control, that is the absence of large exotherms; and gel control or minimization of gel body formation" (specification, page 9).

⁴The term "polydispersity" has not been defined in appellants' specification. The closest dictionary definition we could find was in The Van Nostrand Chemist's Dictionary, Edited by Honig et al., D. Van Nostrand Company, Inc., New York, 1953, page 548 which defined a "polydisperse system" as being a "colloidal system that consists of particles of different sizes." From this definition we construe the meaning of "polydispersity properties" in the context of appellants' specification to mean a system of polymers having different properties such as molecular weight, viscosity, degree of polymerization, etc.

⁵We note that appellants incorporated the Mahabadi patent by reference in its entirety into their specification (see page 3) and included a brief overview of Mahabadi's process. At least at the time the application was filed, appellants placed no emphasis on any difference in the function of Mahabadi's chain inhibitor and their "stable free radical agent" which would patentably distinguish their process over the Mahabadi process.

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present invention would not enable the polymeric products with the desired molecular weight and polydispersity properties of the present invention as disclosed and claimed. Use of chain transfer agents would preclude access to narrow polydispersity polymeric products and higher molecular weight products, since these agents limit chain growth by irreversible chain termination and "transfer" of the free radical species, for example, to a non-reactive species. [Brief, page 5; emphasis in the original.]

The examiner asserts that appellants are arguing limitations (e.g. control of polydispersity) which are outside the scope of the claims.

Our analysis begins with the meaning of the term "stable free radical agents" in the claims on appeal. The terminology in a pending claim is to be interpreted as broadly as reasonably possible. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). It is well settled that claim language is not considered in a vacuum, but in light of the supporting specification and teachings of the prior art as it would be interpreted by one having ordinary skill in the relevant art. In re Sneed, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983); In re Kroekel, 504 F.2d 1143, 1146, 183 USPQ 610, 612 (CCPA 1974); In re Moore, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971). We therefore look to appellants' specification for the meaning of the term "stable free radical agent."

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Appellants disclose that the stable free radical agents employed in the claimed process are well known in the art and that they have been "used to reversibly cap the ends of growing chains to produce oligomers ..." (specification, page 13).

According to appellants, the

... stable free radical agents function as moderators to harness the normally highly reactive and indiscriminate intermediate growing polymer chain free radical species as thermally labile covalent adducts comprised of an oligomer or incipient polymer product and a stable free agent. The rate at which these adducts homolytically cleave back into a free radical terminated polymer chain and a stable free radical is believed to be a rate limiting step which regulates the addition of monomer to the growing chain and which precludes premature chain termination which termination would ordinarily yield polymer products having broad polydispersities. Also, under the polymerization conditions of the present invention, all chains are initiated at about the same time. Initiating all the chains at about the same time and limiting the rate of addition of monomer to the growing chains allows the bulk polymerization stage to be stopped or suspended, in a highly reproducible manner, at the aforementioned desired levels of monomer to polymer conversion.

... If the [molar ratio of stable free radical agent to free radical initiator] is too high then the reaction rate is noticeably inhibited. If the [molar ratio of stable free radical agent to free radical initiator] is too low then the reaction product has undesired increased polydispersity. [Specification, page 14.]

From what appellants have described, we find a reasonable basis for the examiner to conclude that the functions associated with appellants' "stable free radical agent" overlap with the

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functions of Mahabadi's chain inhibitor. According to Mahabadi, the primary function of the chain inhibitor is "to control molecular weight by inhibiting chain growth" (col. 5, lines 36-42). Appellants' "stable free radical agent" also appears to be controlling molecular weight by inhibiting chain growth. Appellants have disclosed the agent has been used to "cap the ends of growing [polymer] chains." This would reasonably infer to one skilled in the art that the molecular weight of the polymer is being controlled since capping the chain necessarily limits any indiscriminate growth of the polymer chain thereby regulating the addition of monomers to the growing chain. Since Mahabadi's process, like appellants' claimed process, requires an initial partial bulk polymerization of the polymer mixture, it is reasonable to attribute the partial polymerization in Mahabadi's process to the inclusion of the chain inhibitor in the monomer mixture.

Finally, it is noted that claim 34 is a product by process claim. The patentability of this claim is based on the product itself. See In re Thorpe, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985); In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972). Since we find appellants' claimed process to be unpatentable, it necessarily follows that the product made by the

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process is also unpatentable. We also find that the product defined by claim 34 is indistinguishable from the product produced by Mahabadi. Appellants have not presented any objective evidence to show that the products are different. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

Accordingly, for the reasons given above, the decision of the examiner is affirmed.

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

AFFIRMED

BRADLEY R. GARRIS)	
Administrative Patent Judge))	
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CAMERON WEIFFENBACH)	BOARD OF PATENT
Administrative Patent Judge))	APPEALS AND
)	INTERFERENCES
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