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United States Patent [19]

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Midler, Jr. et al.

[45] Date of Patent: **May 24, 1994**

[54] **CRYSTALLIZATION METHOD TO IMPROVE CRYSTAL STRUCTURE AND SIZE**

0344898A1 4/1990 European Pat. Off. .
393963 10/1990 European Pat. Off. .
3126854 1/1983 Fed. Rep. of Germany .

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[73] Assignee: **Merck & Co., Inc.**, Rahway, N.J.

[21] Appl. No.: **793,764**

[22] Filed: **Nov. 18, 1991**

M. Midler, et al., Abstract, Annual Meeting American Inst. Chem. Eng., San Francisco, Calif. (Nov. 5, 1989). P. Liu, et al., (abstract) "The Use of Continuously Impinging Jets to Control Crystallization and Particle Size . . .", *Extended Abstracts, American Institute of Chemical Engineers, 1990 Annual Meeting*, paper No. 66B, available to attendees Nov. 11, 1990, at Chicago, IL.

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 706,682, Jun. 3, 1991, abandoned, which is a continuation-in-part of Ser. No. 538,611, Jun. 15, 1990, abandoned.

[51] Int. Cl.⁵ **B01D 9/02**

[52] U.S. Cl. **23/295 R; 23/299; 423/659; 137/896; 239/421; 239/433; 366/173**

[58] Field of Search **137/597, 896; 23/295 R, 23/293 R, 293 A, 293 S, 299; 241/39; 239/420, 421, 433; 366/172, 173, 176; 422/245; 423/659**

A. J. Mahajan, et al., (abstract) "Rapid Precipitation of Amino Acids", *Extended Abstracts, American Institute of Chemical Engineers, 1991 Annual Meeting*, paper No. 74e, available to attendees Nov. 17, 1991, at Los Angeles, Calif.

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Assistant Examiner—Timothy C. Vanoy

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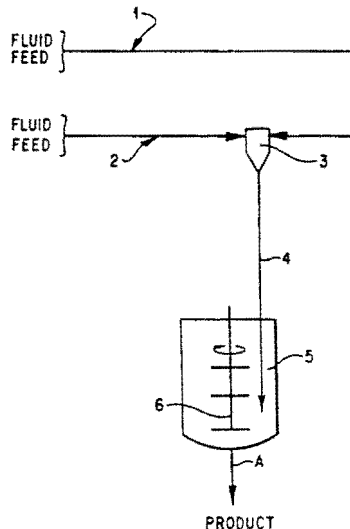
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[57] ABSTRACT

Impinging fluid jet streams are used in a continuous crystallization process to achieve high intensity micromixing of fluids so as to form a homogeneous composition prior to the start of nucleation. This process permits direct crystallization of high surface area particles of high purity and stability.

28 Claims, 4 Drawing Sheets



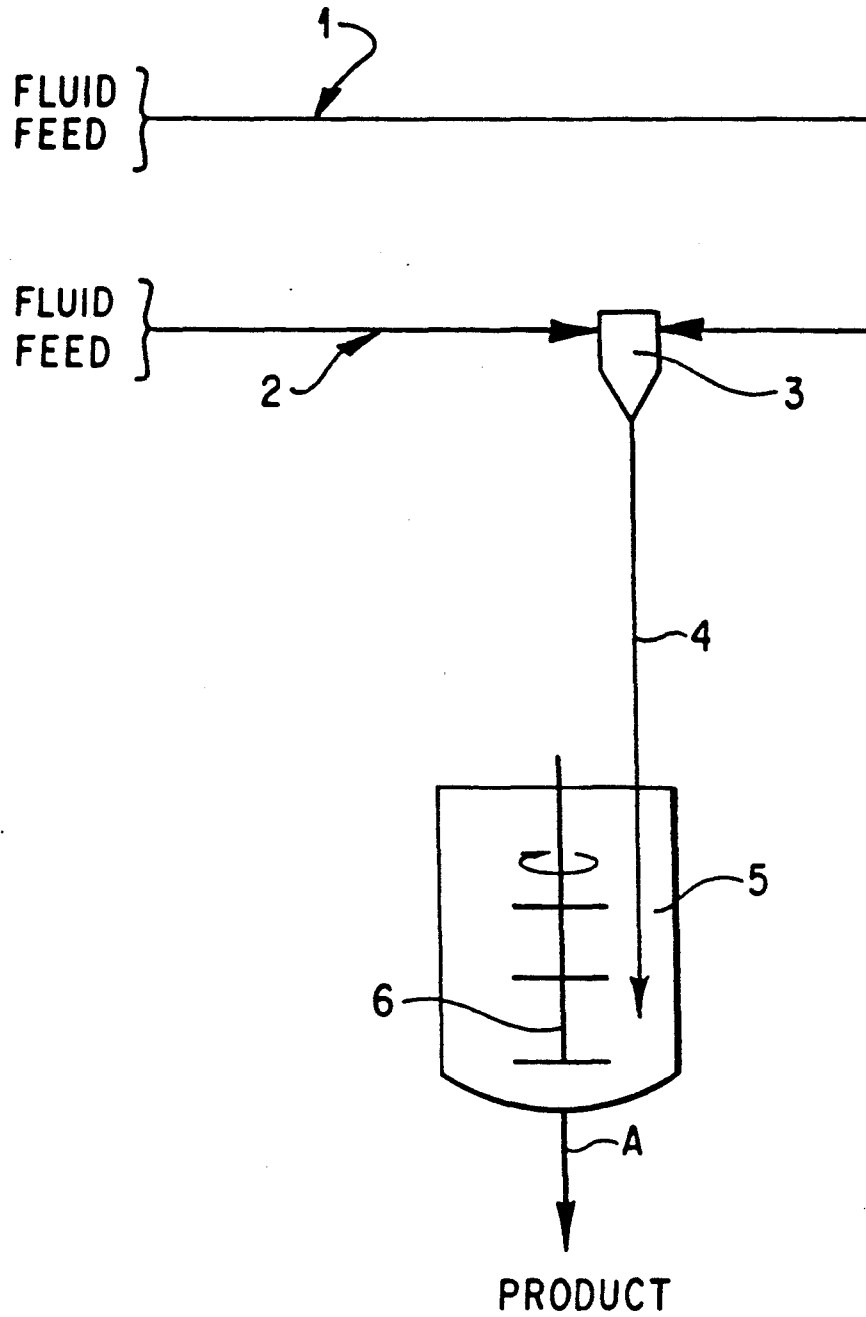


FIG. 1

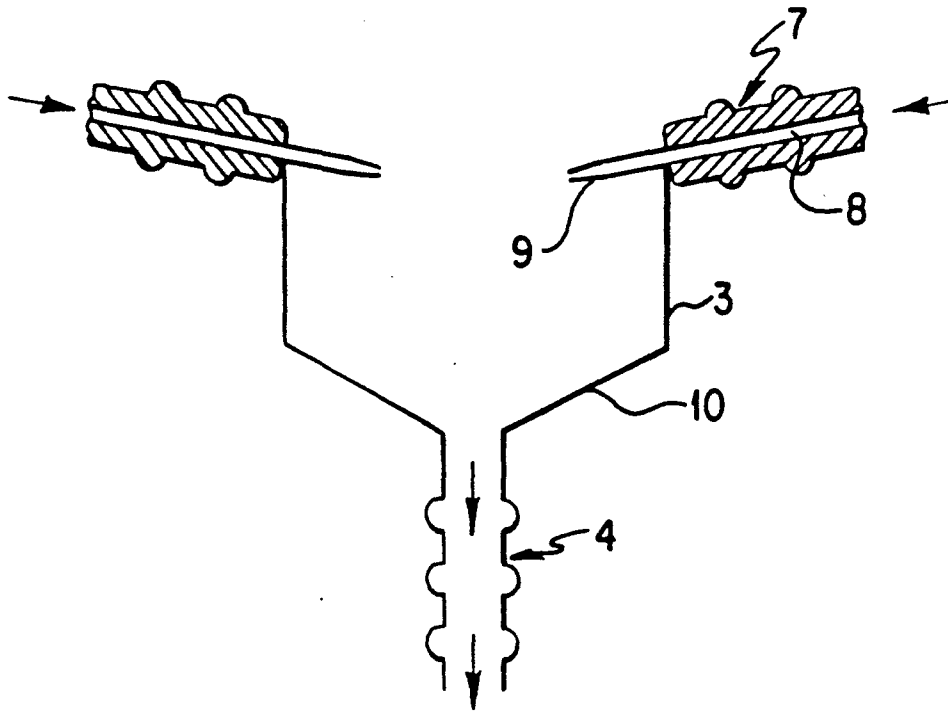


FIG. 2

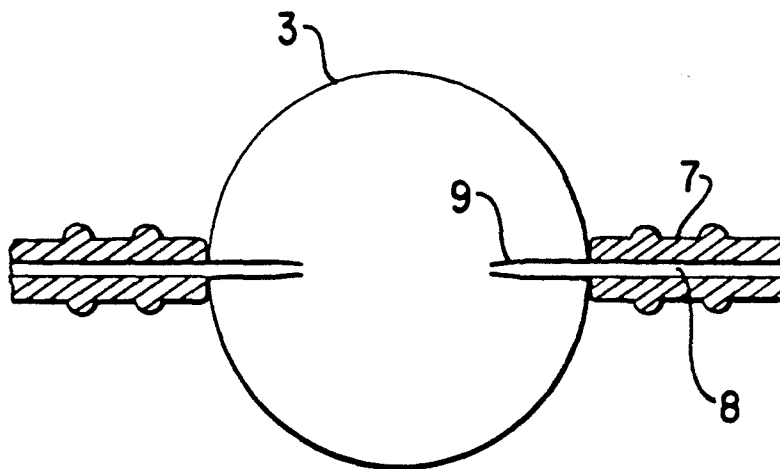


FIG. 3

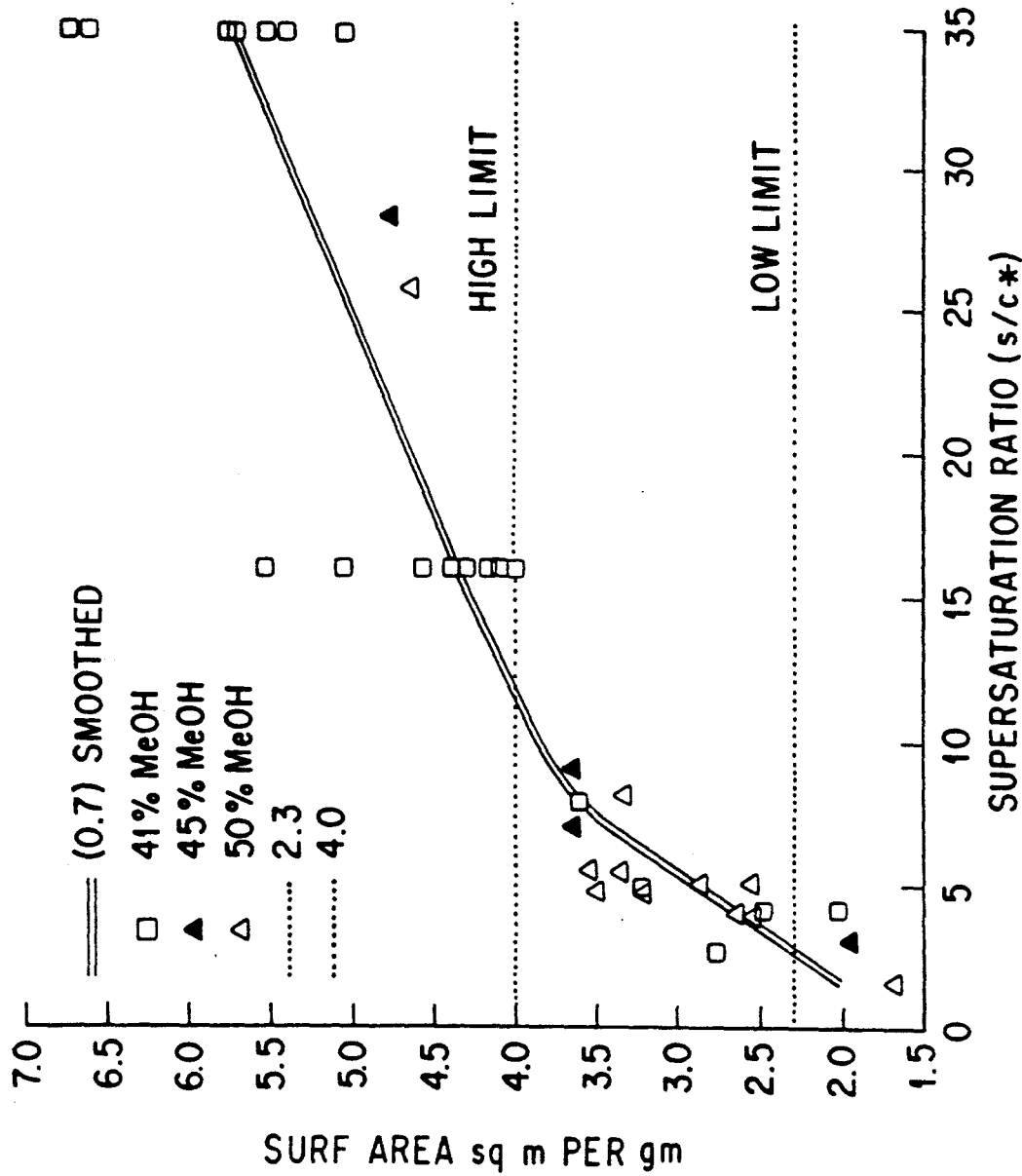


FIG. 4

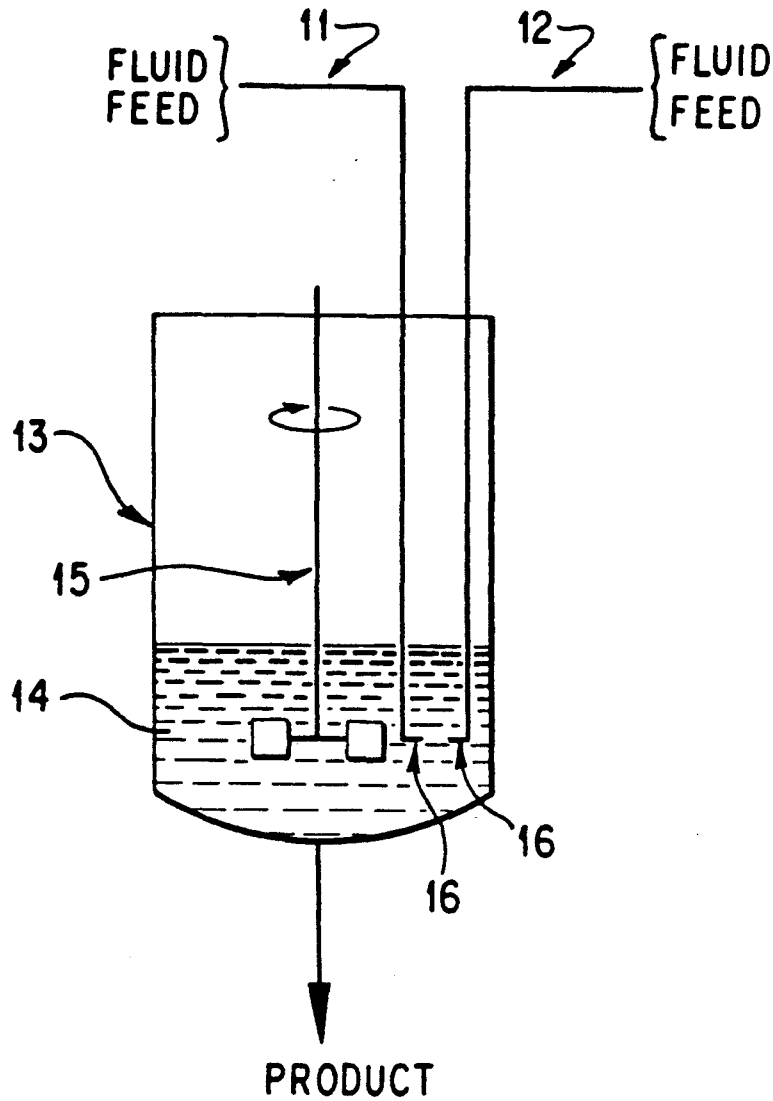


FIG. 5

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