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(54) **FILM AND IMAGE HEATING DEVICE USING FILM**

(71) Applicant: **CANON KABUSHIKI KAISHA**,
Tokyo (JP)

(72) Inventors: **Takanori Mitani**, Tokyo (JP); **Akimichi Suzuki**, Yokohama (JP); **Kazuhiro Doda**, Yokohama (JP); **Satoshi Nishida**, Numazu (JP); **Isamu Takeda**, Yokohama (JP); **Akira Okano**, Kawasaki (JP); **Masahiro Suzuki**, Numazu (JP)

(73) Assignee: **CANON KABUSHIKI KAISHA**,
Tokyo (JP)

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(58) **Field of Classification Search**
None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,217,532 A 6/1993 Sasame et al.
5,309,210 A 5/1994 Yamamoto et al.
7,932,310 B2 4/2011 Gallucci et al.

(Continued)

FOREIGN PATENT DOCUMENTS

JP 1-147579 A 6/1989
JP 3-025481 A 2/1991

(Continued)

Primary Examiner — Clayton E Laballe

Assistant Examiner — Jas Sanghera

(74) *Attorney, Agent, or Firm* — Fitzpatrick, Cella, Harper & Scinto

(57) **ABSTRACT**

A cylindrical film used in an image heating device heating a recording material, on which an image has been formed, has a resin layer, this resin layer being made from a resin in which a crystalline resin and an amorphous resin having a higher glass transition temperature than the crystalline resin are blended, wherein a volume ratio of the crystalline resin with respect to the amorphous resin in the resin layer is 70/30 to 99/1.

17 Claims, 21 Drawing Sheets

