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Coates et al.

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(54) **THERMOFORMABLE ACOUSTIC SHEET**

(75) Inventors: **Michael William Coates**, Glen Iris (AU); **Marek Kierzkowski**, Ferntree Gully (AU)

(73) Assignee: **I.N.C. Corporation**, Oakleigh South (AU)

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,899,380 A 8/1975 Pihlstrom 156/181
3,994,363 A 11/1976 Hirao et al. ..... 181/33 G
4,050,913 A * 9/1977 Roach 96/381

(Continued)

FOREIGN PATENT DOCUMENTS

CA 2 350 477 5/2000

(Continued)

OTHER PUBLICATIONS

Samples of acoustic materials as summarized in Table 1 of Decision of a Delegate of the Commissioner of Patents of Australian Patent Office issued on Feb. 24, 2006, for Application No. 2003100331 (Australian counterpart application of present application).

Primary Examiner—N. Edwards
(74) *Attorney, Agent, or Firm*—Seed Intellectual Property Law Group PLLC

(57) **ABSTRACT**

A thermoformable acoustic sheet formed by a compressed fibrous web including high melt and adhesive thermoplastic fibres in which the adhesive fibres are at least partially melted so that in the compressed web the adhesive fibres at least partially coat the high melt fibres and reduce the interstitial space in the fibre matrix. Also included is a method of producing a thermoformable acoustic sheet which includes the steps of heating a fibre web including high melt and adhesive thermoplastic fibres to at least partially melt the adhesive fibres and compressing the web to form a sheet so that the adhesive fibres at least partially coat the high melt fibres to reduce the interstitial space in the fibre matrix.

26 Claims, 6 Drawing Sheets