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# (12) United States Patent Aoki

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(54)	CASE BODY WITH FRONT PANEL AND
	ACOUSTIC APPARATUS FOR VEHICLE USE

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(51) Int. Cl.	7	 G11B 17	/04

369/77.1, 77.2, 78, 79, 191

## (56) References Cited

#### U.S. PATENT DOCUMENTS

4,655,344 A \* 4/1987 Ackeret ...... 206/307

5,084,855	A	*	1/1992	Kobayashi et al 369/75.2
5,872,757	Α	*	2/1999	Park 369/77.1
6.333.911	<b>B</b> 1	*	12/2001	Sato et al 369/192

<sup>\*</sup> cited by examiner

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### (57) ABSTRACT

To provide a case body with a front panel that achieves a simplified structure and thus reduction in manufacturing cost, and allows a space in the case body to be effectively used. There is provided a case body with a front panel in which driving means is actuated to thereby cause an attitude of a panel 2 to be successively changed from a first state where the panel 2 is substantially parallel to a front surface of a case body 1, to a second state where the panel 2 substantially horizontally projects forward from the front surface of the case body 1, and to a third state where top and bottom as well as inside and outside of the panel 2 are reversed to the first state, wherein the driving means has a panel driving member 68 pivotably coupled to the panel via a drive shaft 68b, and as the drive shaft 68b moves, the shaft member 3 moves in the groove 4 to pivot the panel 2.

#### 7 Claims, 12 Drawing Sheets

