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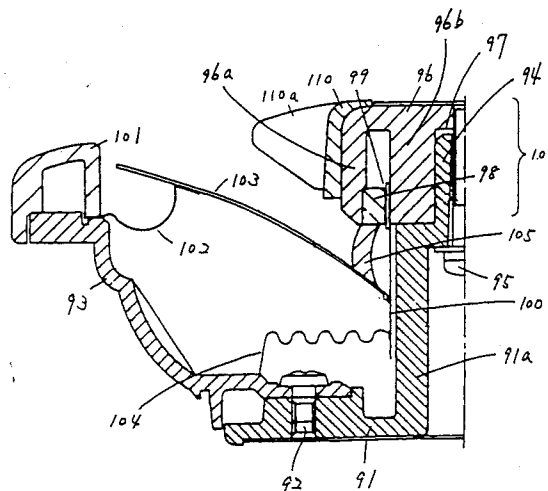
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(54) **A loudspeaker apparatus.**

(57) A yoke (96), which has an inner peripheral wall (96b) formed concentrically with an outer peripheral wall (96a), is used in a magnetic circuit of a loudspeaker. A rare earth element magnet ring (98) is disposed between the outer and inner peripheral walls of the yoke (96) so as to form a magnetic gap (99) there. Thus, a compact, light and powerful magnetic circuit is obtained. The magnetic circuit is disposed in front of a diaphragm (103), which reduces the thickness of the loudspeaker. By making the projected area of the magnetic circuit on the diaphragm a half or less of the effective area of the diaphragm, deterioration of the performance properties and the quality of reproduced sounds can be avoided. Moreover, a heat dissipator (110) is provided on the yoke (96) so as to prevent any extraordinary or damaging increase in temperature of a voice coil even when large signals are continuously input to the loudspeaker. As a result, performance properties of the loudspeaker can be stabilized and reliability thereof can be enhanced.

Fig. 9

**EP 0 624 049 A3**



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EUROPEAN SEARCH REPORT

Application Number
EP 94 10 6578

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
Y	DE-A-41 26 121 (MAC AUDIO ELECTRONIC GMBH) * column 3, line 42 - column 4, line 6; figure *	1	H04R9/06 H04R9/02
A	---	5	
Y	WO-A-93 03586 (AURA SYSTEMS, INC.)	1,9	
A	* page 10, line 13 - page 11, line 17; figure 4 *	4,12	
Y	---	9	
A	US-A-4 327 257 (SCHWARTZ) * column 10, line 61 - column 11, line 4; figures 15,16 * * column 7, line 56 - line 64; figure 1 *	1,10,11	
A	---	1,5,13	
A	DE-A-36 38 693 (BOSE CORP.) * column 2, line 53 - column 3, line 27; figures 1-3 *	1	
A	---	1	
A	DE-A-30 07 991 (ELEKTROTECHNIK EHMANN GMBH) * page 10, line 24 - page 12, line 10; figure *	6,7	TECHNICAL FIELDS SEARCHED (Int.Cl.5) H04R
A	---	9	
A	US-A-4 933 975 (BUTTON) * column 4, line 1 - line 65; figures *	9	
A	---	9	
A	US-A-3 763 334 (PARKER) * column 2, line 3 - column 3, line 7; figures *	9	
A	---	9	
A	US-A-4 379 951 (GABR) * column 11, line 15 - line 22; figure 27 *	9	
A	---	9	
A	FR-A-2 667 212 (P.H.L. AUDIO) * figure *	9	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 December 1994	Examiner Gastaldi, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions.

namely:

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- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims 1-8 : A loudspeaker comprising: a supporting member having a center pole; a frame connected with the supporting member; a yoke having a pot-like shape, said yoke being attached at the top end of the center pole; a magnet; a voice coil; a diaphragm.
2. Claims 9-13 : A loudspeaker comprising: a yoke having a pot-like shape; a frame; a magnet; a voice coil; a diaphragm; a heat-dissipating means.