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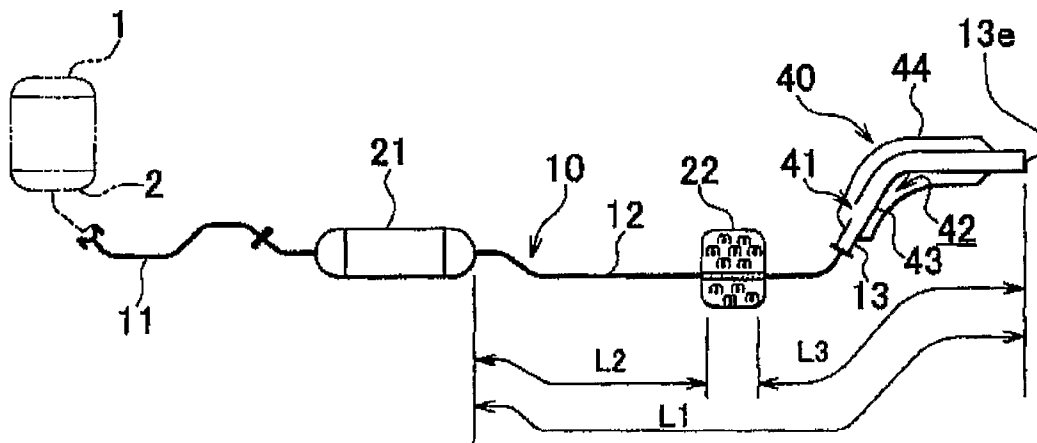
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(54) Title: EXHAUST SILENCER DEVICE FOR INTERNAL COMBUSTION ENGINE

FIG. 1



(57) Abstract: An exhaust silencer device for an internal combustion engine which includes: an exhaust pipe (10) that forms an exhaust passage from an engine (1), and an exhaust opening; and a muffler (22) attached to the exhaust pipe (10) so as to silence exhaust sound from the engine (1). The piping lengths of the exhaust passages (L2, L3) on two sides of the muffler (22) are substantially equal. At least one of the two exhaust passages (L2, L3) equal in piping length has a hole (41) that makes the resonance frequencies of the two exhaust passages (L2, L3) different from each other.

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Minimum documentation searched (classification system followed by classification symbols)
F01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 726 397 A (MUKAI TERUAKI [JP] ET AL) 10 March 1998 (1998-03-10)	1-6,8-13
Y	column 2, line 60 - column 4, line 61; figures 1-4 abstract	7
Y	JP 04 262014 A (TOYODA GOSEI KK) 17 September 1992 (1992-09-17) abstract; figure 2	7
X	US 5 493 080 A (MOSS HANS [NL]) 20 February 1996 (1996-02-20) abstract; figure 1	1,3
A	JP 59 226222 A (NISSAN MOTOR) 19 December 1984 (1984-12-19) the whole document	1



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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5726397	A	10-03-1998	JP 2971341 B2 JP 8114117 A	02-11-1999 07-05-1996
JP 4262014	A	17-09-1992	NONE	
US 5493080	A	20-02-1996	SE 510530 C2 SE 9300732 A	31-05-1999 06-09-1994
JP 59226222	A	19-12-1984	JP 1022452 B JP 1540918 C	26-04-1989 31-01-1990