

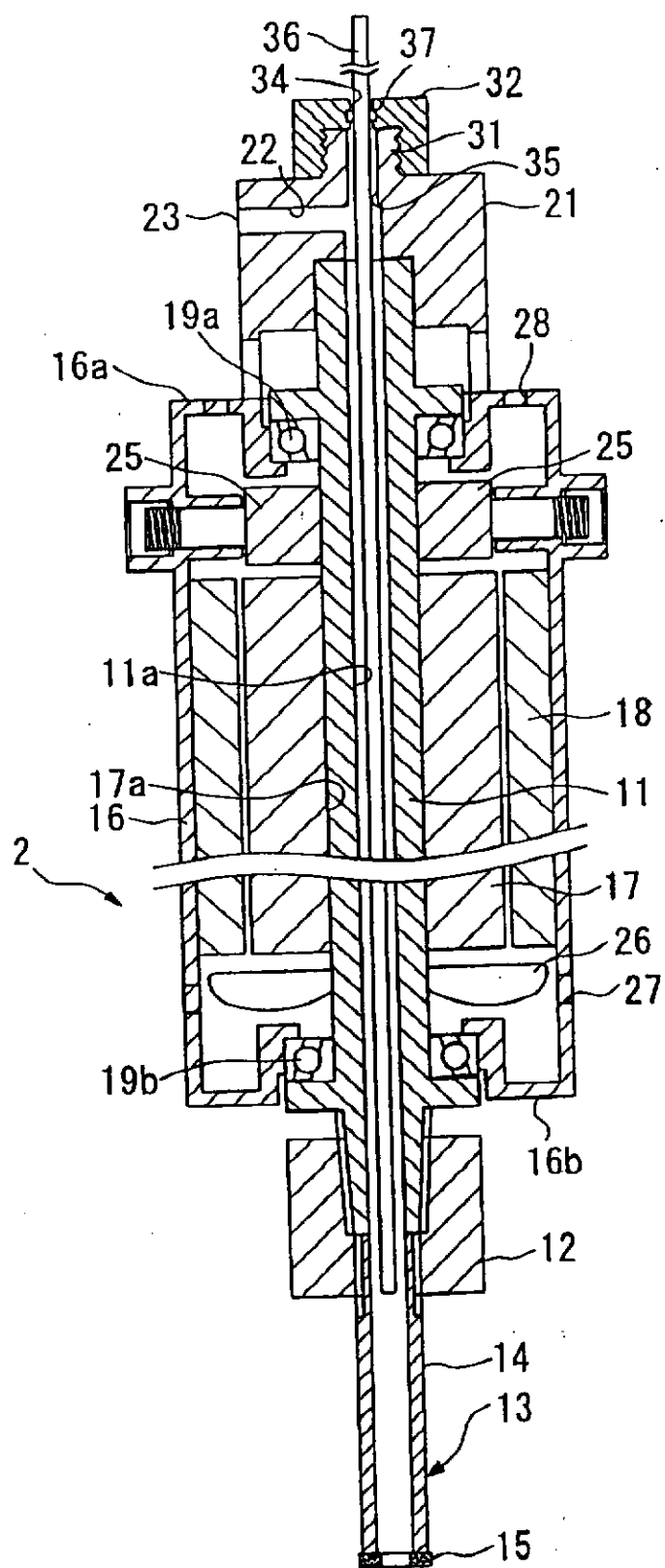


FIG. 3

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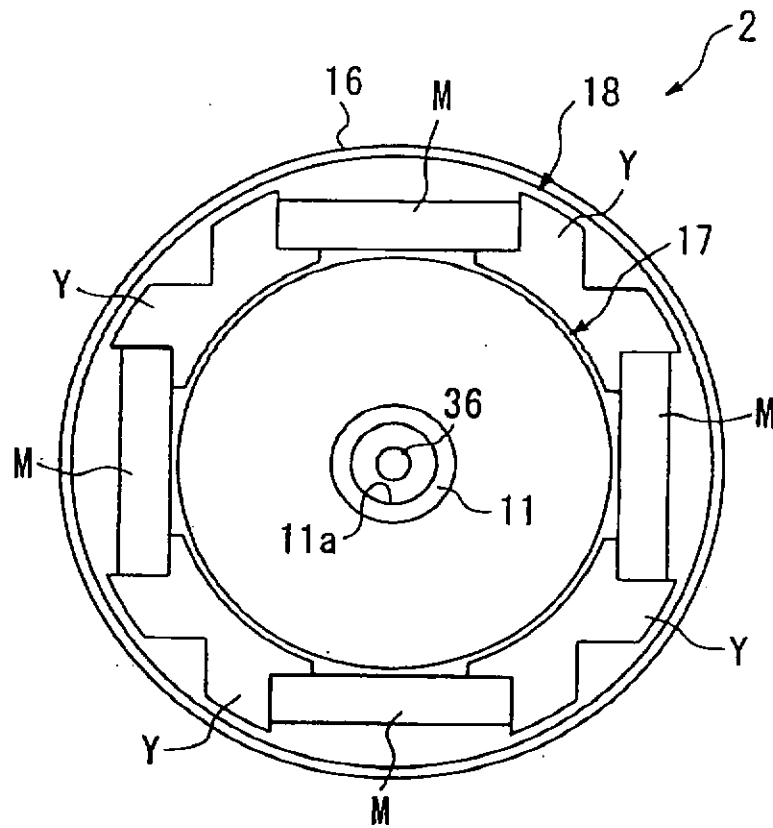


FIG. 4

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(RESULT OF TEST)

Switchover of rotation	Actual rotational speed rpm	Perforating time sec	Distance of sound measurement m	Noise dB
Low speed	2000-3500	49.00	1	71
	2000-3500	44.57	2	75.1
	2000-3500	43.92	3	74.7
High speed	5700-6300	26.00	1	77.9
	4900-6100	24.58	2	76.4
	4700-6100	24.37	3	75.6

FIG. 5

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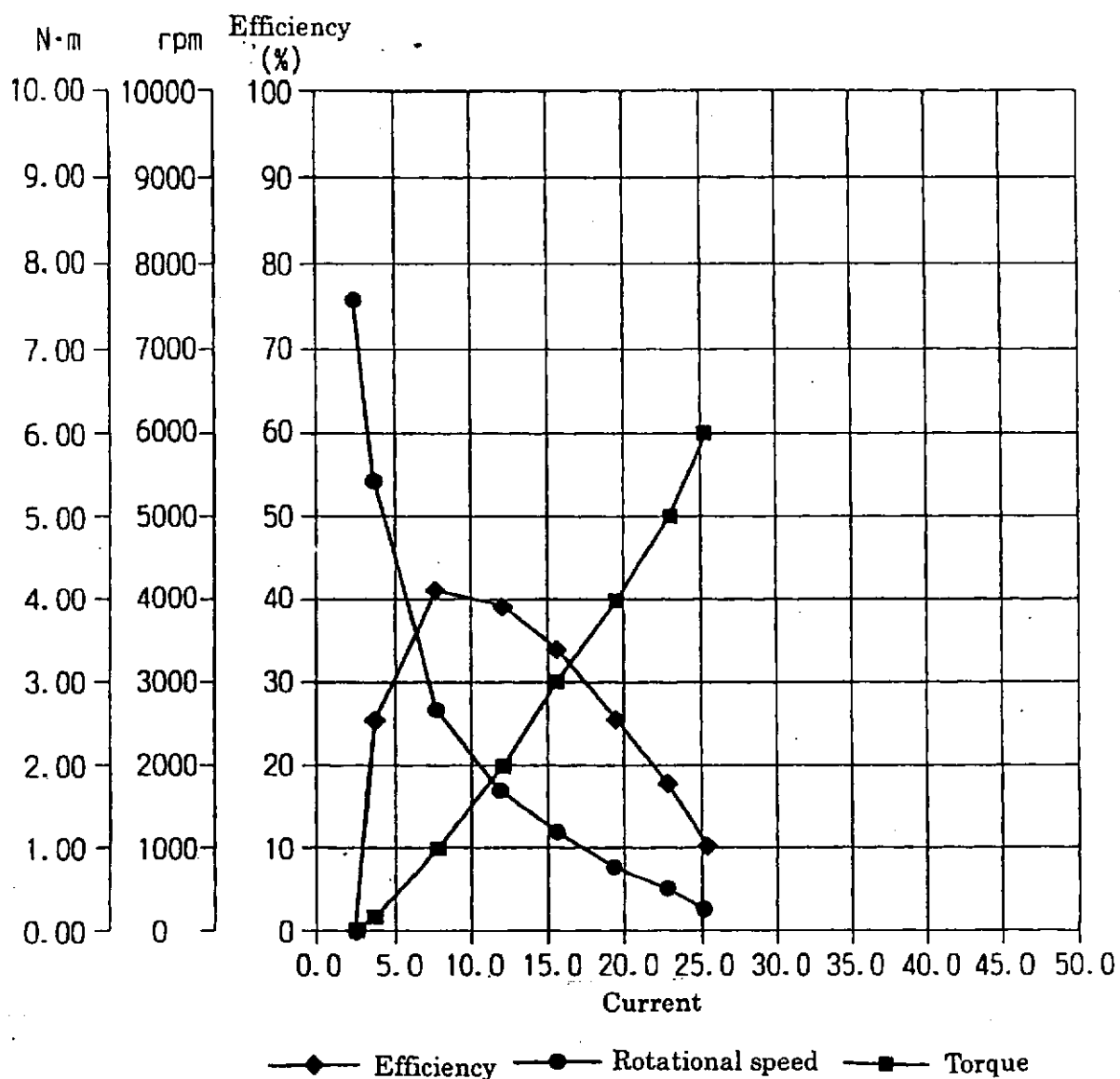
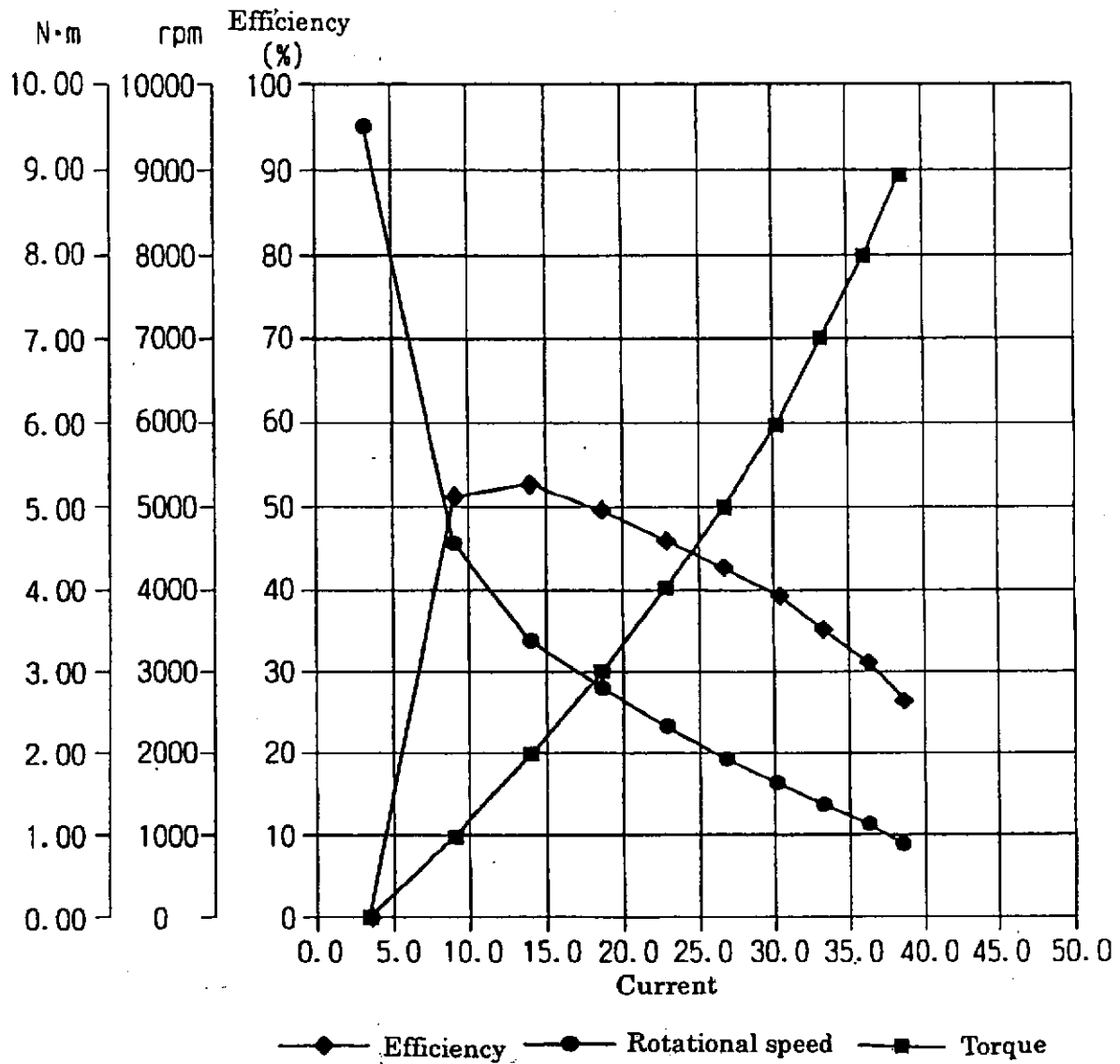


FIG. 6

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FIG. 7

	Circumferential speed m/min	Perforating time sec	Noise dB	Cutting efficiency m ³ /sec
Direct motor	289	24	72	261
Conventional electric motor	66	139	82	56

FIG. 8

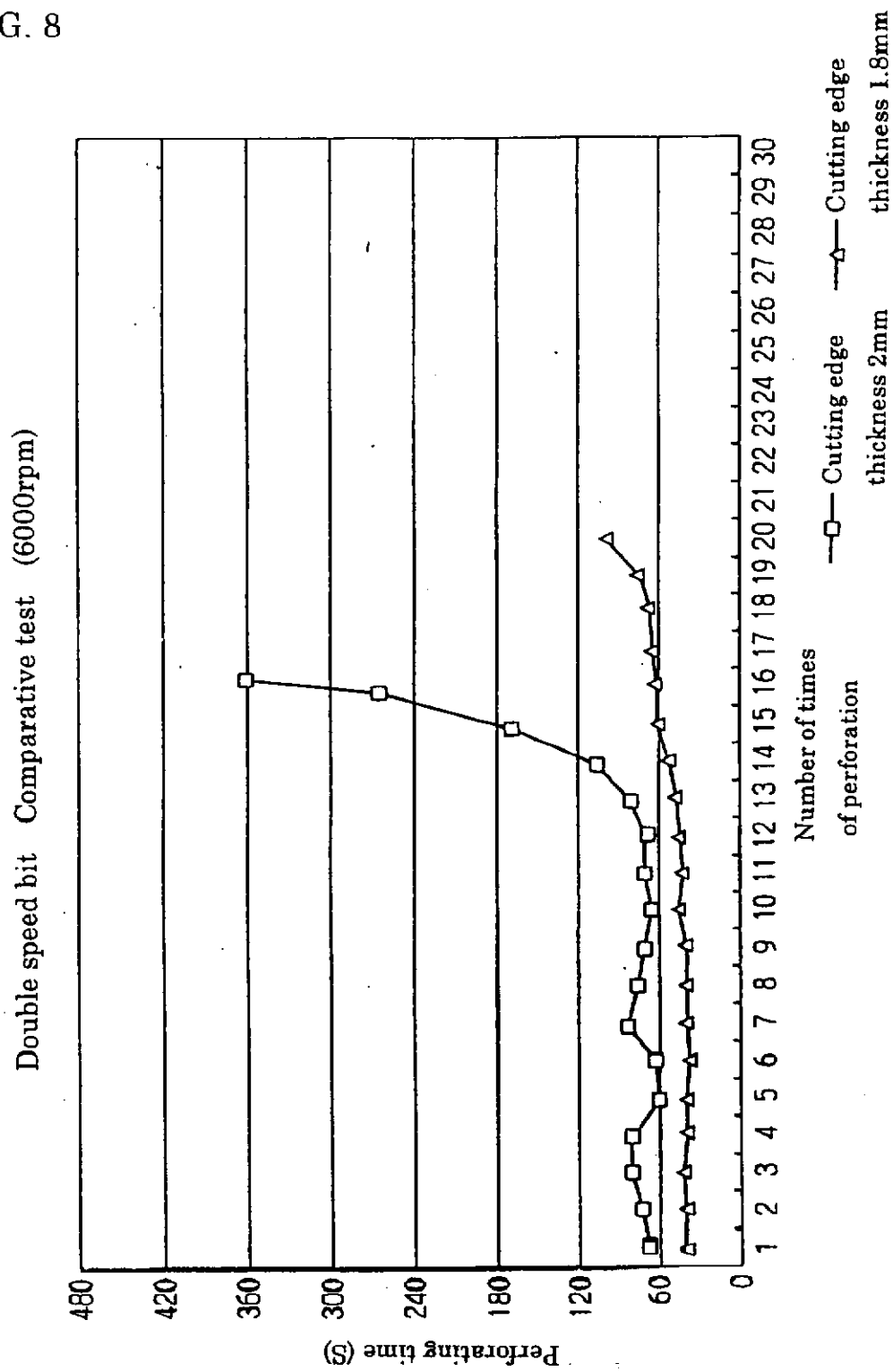


FIG. 9

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