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(56) **References Cited**

U.S. PATENT DOCUMENTS

39,678 A 8/1863 Russell
605,436 A 6/1898 Kellogg
(Continued)

FOREIGN PATENT DOCUMENTS

EP 0341967 11/1989
GB 2400565 10/2004
(Continued)

OTHER PUBLICATIONS

Mathison et al. (Nasal Route for Direct Delivery of Solutes to the Central Nervous System: Fact or Fiction? Journal of Drug Targeting, 1998. vol. 5 No. 6 pp. 415-441.*

(Continued)

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(57) **ABSTRACT**

A delivery device for and method of providing for delivery of substance to the central nervous system (CNS) of a subject, the delivery device comprising: a nosepiece unit (17) for insertion into a nasal airway (1) of a subject and comprising an outlet unit (21) which includes a nozzle (25) for delivering substance into the nasal airway of the subject; and a substance supply unit which is operable to deliver a dose of substance to the nozzle: wherein the delivery device is configured such that at least 30% of the dose as initially deposited in the nasal airway is deposited in an upper posterior region of the nasal airway, thereby providing a CNS concentration of the substance, and hence CNS effect, which is significantly greater than that which would be predicted from a counterpart blood plasma concentration of the substance.

39 Claims, 11 Drawing Sheets

