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Franzen

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[54] **METHOD AND DEVICE FOR THE REFLECTION OF CHARGED PARTICLES ON SURFACES**

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[52] **U.S. Cl.** ..... **250/396 R**; 250/292

[58] **Field of Search** ..... 250/396 R, 292, 250/293, 290

[56] **References Cited**

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[57] **ABSTRACT**

The invention relates to methods and devices for the reflection of positively and negatively charged particles of moderate kinetic energies at surfaces of any form. The invention consists in the production of a virtual or real surface for reflecting charged particles by creation of strongly inhomogenous high frequency fields of low penetration range into the space above the surface. The inhomogenous electric field is produced by supply of a high frequency voltage to a narrow grid pattern forming the surface and consisting of electrically conducting electrodes, isolated from each other. The electrode elements of the pattern are regularly repeated in at least one direction within the surface. The phases of the high frequency voltage are connected alternately to subsequent grid elements. The invention can be used to build new types of ion storage devices and ion guides for the transport of ions in moderate and high vacuum. New types of mass filters can be produced by this invention. In contrast to the well-known RF multipole rod systems, the invention leads to systems with easy production, high mechanical stability, and high efficiency for the thermalization of fast ions.

42 Claims, 6 Drawing Sheets