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# United States Patent [19]

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Hoover et al.

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[54] **ION EMPLACEMENT IN SOIL WITH CHIM ELECTRODES**

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[73] Assignee: **The United States of America as represented by the Secretary of the Interior**, Washington, D.C.

Smith et al, "Preliminary Studies of the CHIM Electrochemical Method at the Kokomo Mine, Russell Gulch, Colorado", *J. of Geochemical Exploration*, 45 (1993) pp. 257-278.

[21] Appl. No.: **476,926**

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### [57] ABSTRACT

#### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 169,234, Dec. 20, 1993, abandoned.

An apparatus and method for soil remediation replaces specific ions in the soil electrochemically, using a DC voltage source and special multicompartment anodes and cathodes, each comprising an inner compartment containing electrolyte and a submerged electrode, a salt bridge connecting the electrolyte to an outer compartment containing a specific solution with replacement ions for soil remediation, and a membrane holding in the replacement solution. The membrane is put into contact with the soil, allowing electrical contact and ion migration while keeping the solution inside the anode or cathode. The multicompartment structure prevents the hydroxide and hydronium ion emplacement that causes acid and base fronts to form.

[51] Int. Cl.<sup>6</sup> ..... **B01D 61/42**

[52] U.S. Cl. .... **204/515; 204/516; 204/517; 205/687; 205/742; 205/746; 205/771; 205/772**

[58] Field of Search ..... **204/400, 435, 204/515-517; 205/687, 742, 771, 772, 746-750**

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**4 Claims, 1 Drawing Sheet**

