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**United States Patent** [19]  
**Watten**

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[54] **APPARATUS FOR CARBON DIOXIDE  
PRETREATMENT AND ACCELERATED  
LIMESTONE DISSOLUTION FOR  
TREATMENT OF ACIDIFIED WATER**  
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represented by the Secretary of the  
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[56] **References Cited**  
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[57] **ABSTRACT**  
The method of reducing the acidity in effluent discharges comprises charging the effluent with carbon dioxide, intermittently fluidizing and expanding at least one pulsed limestone bed with the charged effluent, treating the charged effluent with the limestone in the bed, displacing the limestone treated effluent with untreated charged effluent, stripping excess carbon dioxide from the effluent after treatment in the limestone bed, and discharging the limestone treated effluent.

**Related U.S. Application Data**  
[62] Division of Ser. No. 735,134, Oct. 22, 1996.  
[51] **Int. Cl.<sup>6</sup>** ..... **B01D 24/28**  
[52] **U.S. Cl.** ..... **210/150; 210/151; 210/188;**  
210/195.1; 210/274  
[58] **Field of Search** ..... 210/150, 151,  
210/188, 195.1, 274

**14 Claims, 12 Drawing Sheets**

