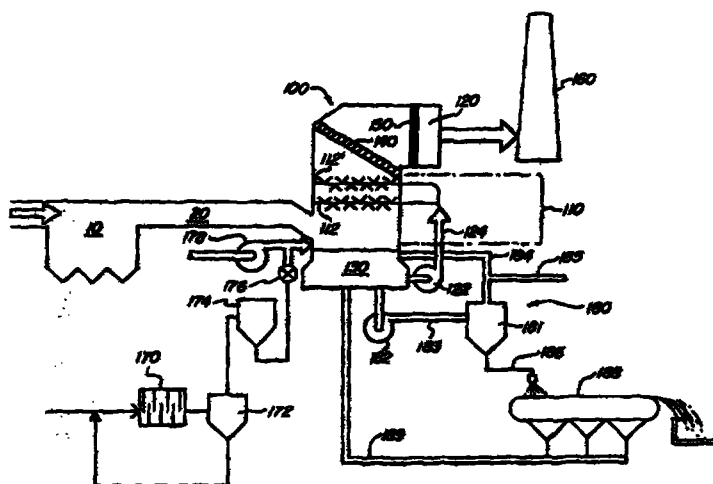




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(54) Title: **IMPROVED WET SCRUBBING METHOD AND APPARATUS FOR REMOVING SULFUR OXIDES FROM COMBUSTION EFFLUENTS**



(57) Abstract

Sulfur oxides (SO_x) are scrubbed from combustion effluents with aqueous limestone slurries single-loop, open-tower countercurrent limestone wet scrubbers. Effluent flow rates are greatly increased while L/G values and reaction tank (150) residence times are decreased. Improved entrainment eliminator design, nozzle (112) placement and spacing, and the use of a hydrocyclone (181) to separate and recycle smaller particles of limestone from the byproduct gypsum, facilitate these advantages. Limestone is reduced to very fine particles, e.g. about 8μ or less with more than 99 % of the particle by weight less than 44μ , and introduced into a scrubbing slurry which is contacted with SO_x -laden effluent. Reactivity of the scrubbing slurry is maintained, even at reduced pH, by continuously operating a hydrocyclone to assure a molar ratio of calcium-containing to sulfur-containing compounds of greater than about 1.3 to 1 while keeping both a low chloride and low non-reactive solids content. The hydrocyclone removes large particles of calcium sulfate and provides a recycle stream (184) of fine calcium carbonate and non-reactive solids which is bled off as necessary to maintain both the desired low chloride and non-reactive solids levels.

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