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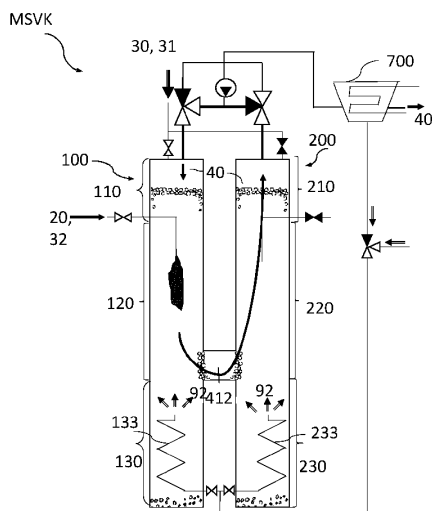


Fig. 8

(57) Abstract: The present invention relates to a decarbonation process of carbonated materials, in particular limestone and dolomitic limestone, with CO₂ recovery in a multi-shaft vertical kiln (MSVK) comprising a first and a second shaft with preheating, heating and cooling zones and a cross-over channel between each shaft, alternately heating carbonated materials by a combustion of at least one fuel with at least one comburent, up to a temperature range in which carbon dioxide of the carbonated materials is released, the combustion of the fuel and the decarbonation generating an exhaust gas, wherein decarbonated materials are cooled in the cooling zones with one or more cooling streams, said process further comprising cooling the decarbonated materials with the one or more cooling streams comprising a water steam stream, said stream being fed in the cooling zone of at least the first and/or the second shaft.

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