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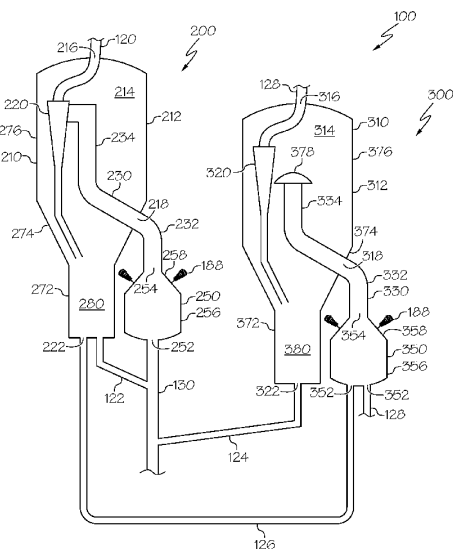


FIG. 1

(57) Abstract: According to one or more embodiments, particulate solids may be regenerated in a particulate solid treatment vessel. The particulate solid treatment vessel may be connected to a riser. The riser may extend through a riser port of an outer shell of a particulate solid separation section such that the riser may comprise an interior riser segment and an exterior riser segment. The particulate solid separation section may include a gas outlet port, a riser port, and a particulate solid outlet port. The particulate solid separation section may house a gas/solids separation device and a particulate solid collection area. The riser port may be positioned on a sidewall of the outer shell such that it is not located on a central vertical axis of the particulate solid separation section. The particulate solids may be separated from gasses in the particulate solid separation section.

[Continued on next page]

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