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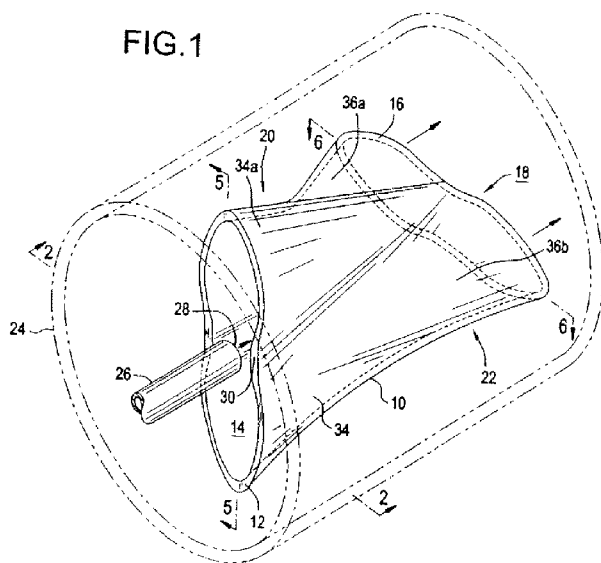
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(54) Title: MIXING SYSTEM COMPRISING AN EXTENSIONAL FLOW MIXER

FIG.1



(57) Abstract: The invention provides a mixing system comprising the following: A) at least one extensional flow mixer comprising: a generally open and hollow body having a contoured outer surface and having: a single entrance port and a single exit port; a means for compressing a bulk stream flowing through the generally open and hollow body in a direction of flow, and at least one injected additive stream introduced at the single entrance port in the direction of flow; and a means for broadening the bulk stream and the at least one injected additive stream, such that an interfacial area between the bulk stream and the at least one injected additive stream is increased as the bulk stream and the at least one injected additive stream flow through the generally open and hollow body in the direction of flow to promote mixing of the bulk stream and the at least one injected additive stream; B) a flow conductor having an axis and having a generally open and hollow flow mixer body secured therein; and C) a primary additive stream injector positioned at the entrance port of the generally open and hollow flow mixer body, wherein the primary additive stream injector injects an additive stream into the interior of the

flow mixer in the direction of flow, when the bulk stream is flowing through the generally open and hollow flow mixer body, to allow for compression and broadening of the bulk stream and the additive stream together within the extensional flow mixer, to facilitate mixing of the bulk stream and the primary additive stream at an exit of the extensional flow mixer; and wherein the extensional flow mixer is followed by D) at least one helical static mixing element that is at least one half "flow conductor diameter (D₁)" downstream of the exit of the extensional flow mixer.