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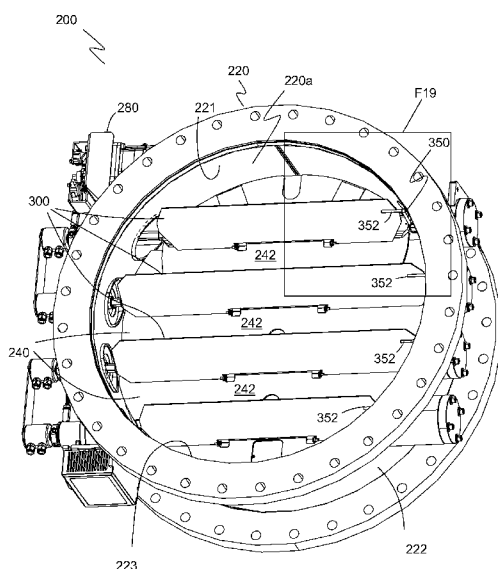


Fig. 18

(57) Abstract: A multi-vane throttling valve for a vacuum process chamber includes a reciprocal vane pivotally connected to and extending backwardly away from a back side of each of a plurality of rotatable vanes, and a stationary reciprocal vane angling assembly fixed in a predefined position and having an assembly pin extending transversely toward the reciprocal vane a predefined distance sufficient to support the reciprocal vane whereby the stationary angling assembly causes the reciprocal vane to pivot in a range between a substantially parallel position with the respective rotatable vane and a transverse position with the respective rotatable vane when the respective rotatable vane is rotated.