

[54] MAGNETRON METHOD AND APPARATUS FOR PRODUCING HIGH DENSITY IONIC GAS DISCHARGE

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[58] Field of Search 204/192.12, 192.32, 204/298.06, 298.16, 298.37, 298.38; 156/345, 643; 118/723

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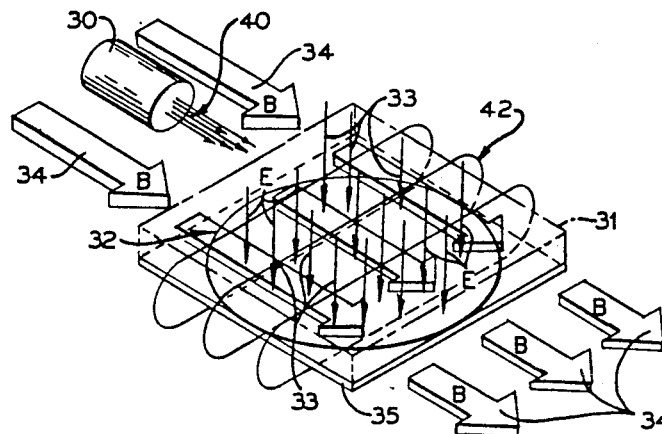
Primary Examiner—Aaron Weisstuch

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[57] ABSTRACT

A method and apparatus for magnetron gas discharge processing of substrates using a remote plasma source provides a uniform magnetic field (B) created across the surface of a substrate in an evacuable chamber. An electric field (E) is created perpendicular to the substrate by an electrically powered cathode located beneath the substrate. The magnetic and electric fields interact with the plasma to create an E × B electron drift region adjacent to the surface of a substrate. A remote plasma source is provided and oriented so that the plasma stream from the remote source is coupled to the E × B region adjacent to the substrate surface parallel to the magnetic field with minimal movement of the plasma stream perpendicular to the magnetic field to thereby provide a high density plasma stream into the E × B drift region.

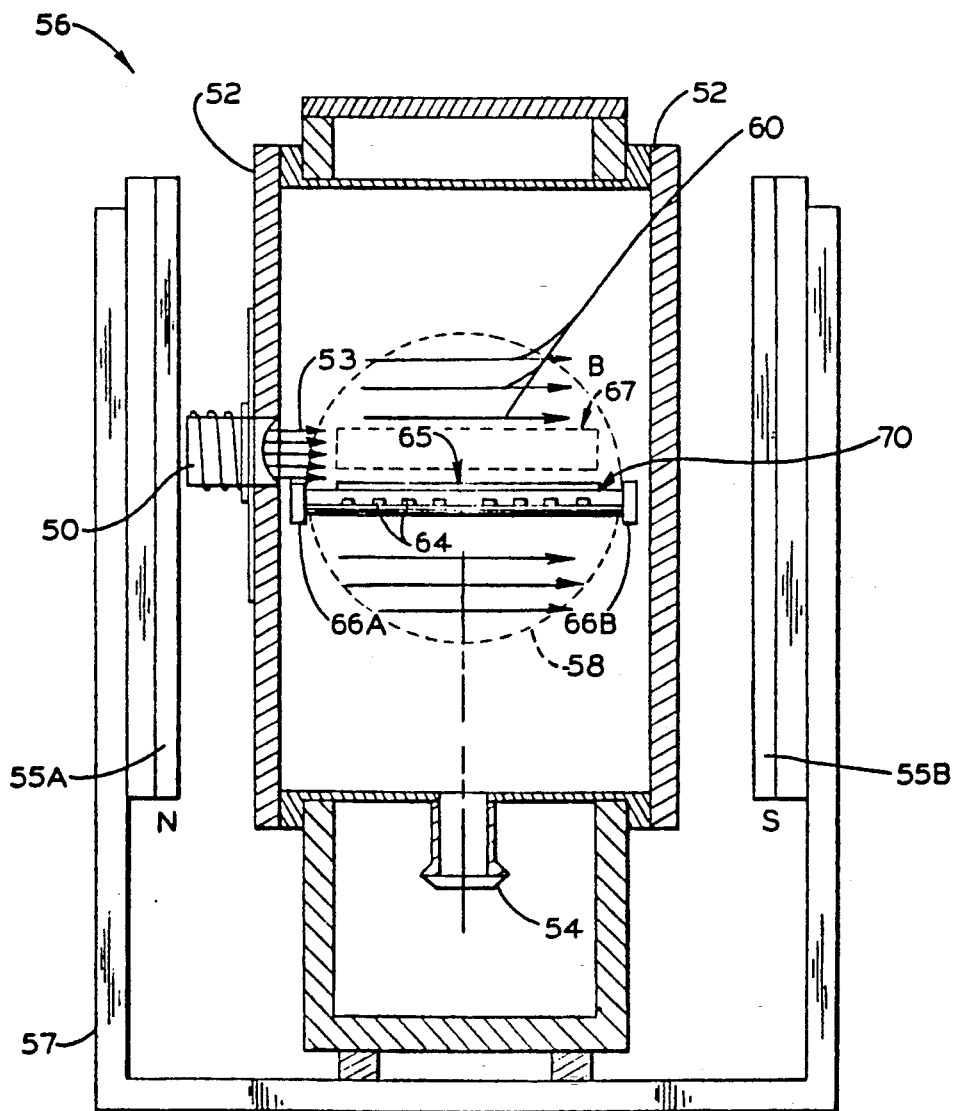
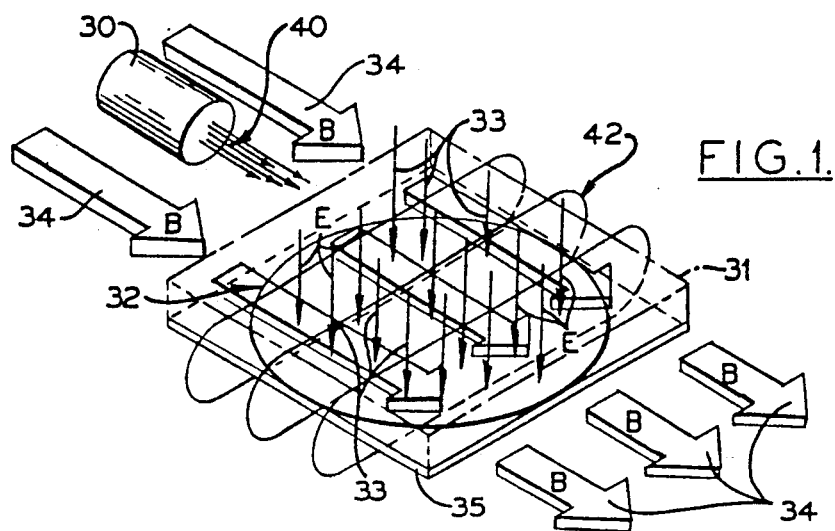
52 Claims, 6 Drawing Sheets



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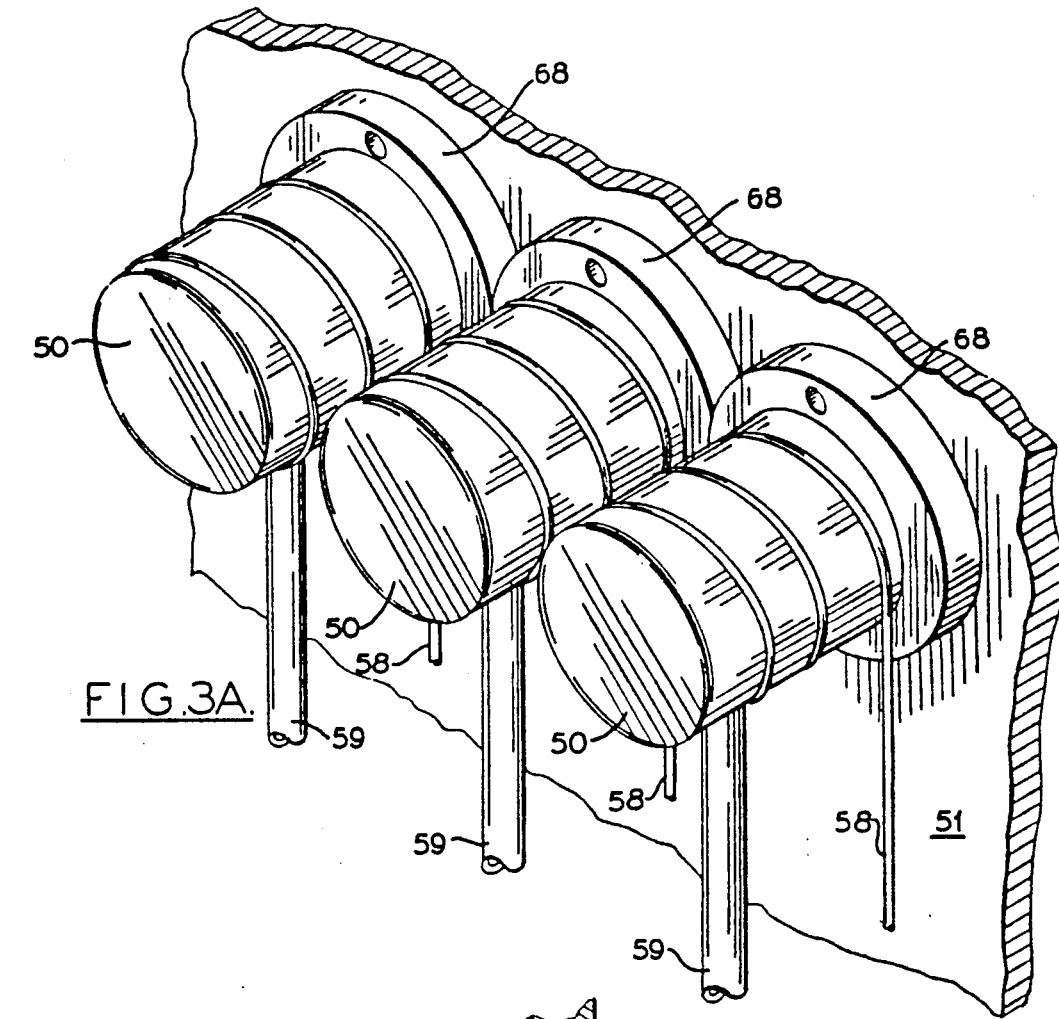


FIG. 3A.

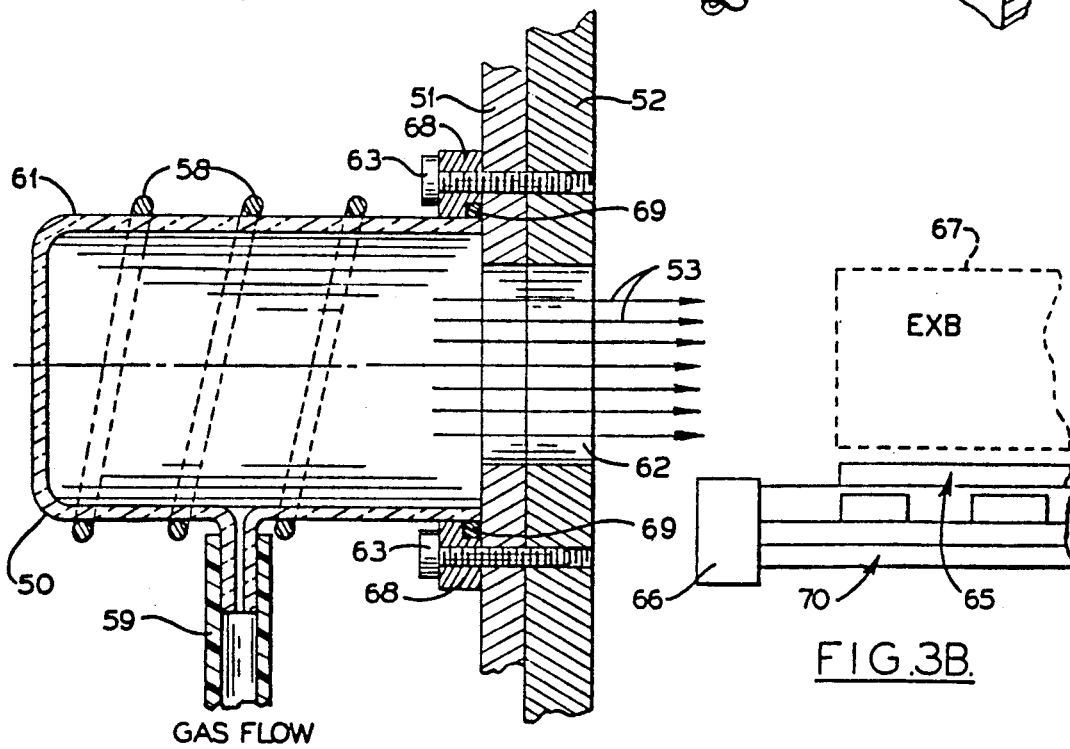


FIG. 3B.

GAS FLOW

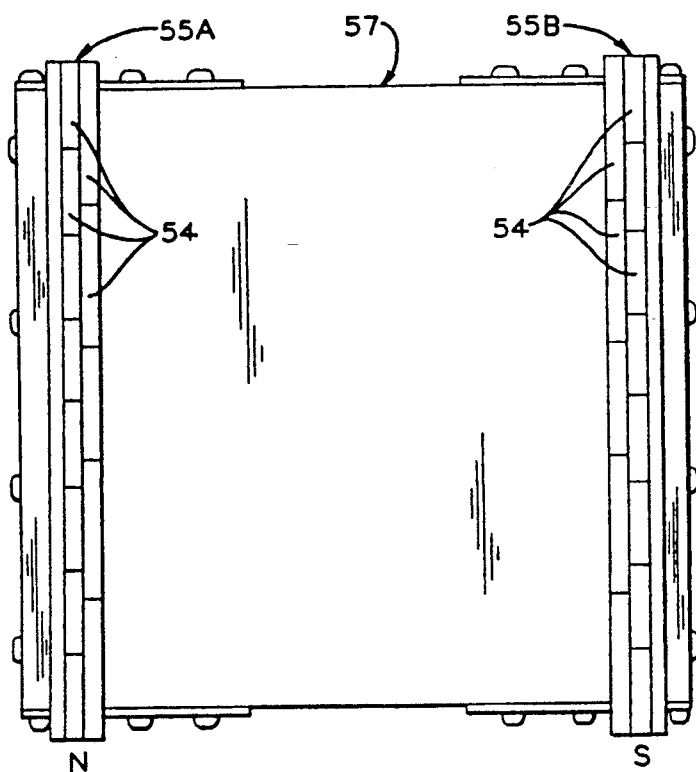


FIG. 4.

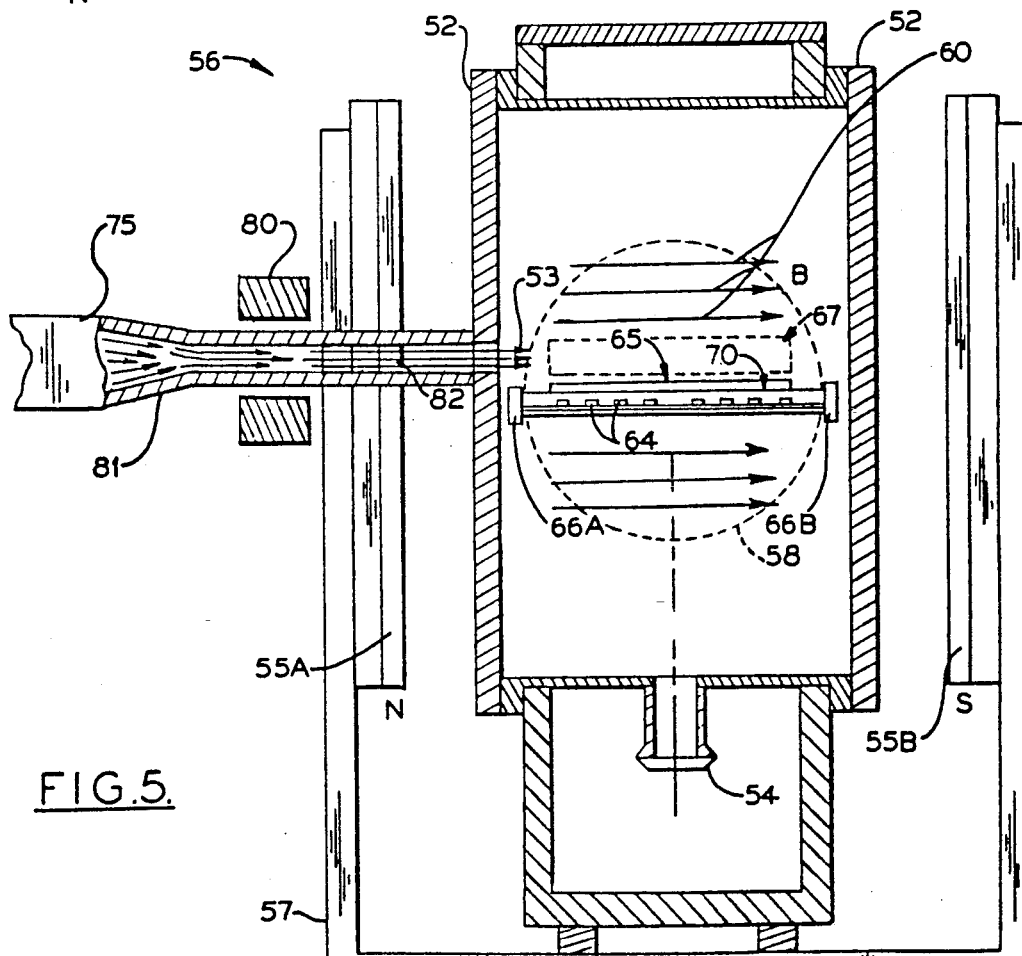


FIG. 5.

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