of holes or apertures within the material in this second portion **128***b* so as to modify its physical characteristics. By providing such a grading it is possible to reduce the possibility of reflected signals propagating within the power splitter arising from a reflection of those signals against the leading edge of the former. In a similar fashion the physical characteristics—for example the dimension or density or dielectric constant—of the former could also be varied along the radial axis extending transverse to the longitudinal axis of the transmission line **116**. Control of the grading in the radial direction may be used to affect control of the capacitance between the winding of the secondary and the inner core and outer shield of the primary. Controlling the grading of the former in the axial direction controls reflection and phase velocity. Also noted above in the case that the transmission line is shorted then in a preferred arrangement the former has a dimension not greater than ¼ the wavelength of the standing wave generated. In the case that the transmission line is open ended then in a preferred arrangement the former has a dimension not greater than ½ the wavelength of the standing wave generated.

[0052] In such arrangements the power splitter is used to generate a plurality of signals from a single transmission line. However, the system could be used in an inverse fashion as a combiner whereby multiple power sources perhaps of different frequencies, in either single-ended and/or differential signal format, could be coupled into a single transmission line which can be coupled to an antenna for broadcast purposes. Examples of such applications include the provision of signals for mobile telecommunication antenna where for example in a patch or microstrip antenna, a plurality of out-of-phase signals are required for transmission purposes. It is known to use power splitters in such environments but it will be understood that a power splitter as provided within the context of the present teaching with its ability to split an input signal to an arbitrary number, n, of secondary output signals each of which could be configured to have its own power level. One could also use such a power splitter for steering antenna purposes by changing the phase delay between individual loops and the corresponding antenna element.

[0053] A power combiner as provided in accordance with the teaching of the present specification can be considered as having application to any environment where a broadband signal is required. By using such a power combiner it is possible to provide a broadband RF amplifier where for example multiple-deck amplifiers are combined into a single high-output source. By driving multiple gain devices operable at the same frequency within individual signals from a common low power source and then combining the outputs of those devices using a combiner in accordance with the present teaching it is possible to provide at the output of such a device a high output source. As the input signals are inductively coupled into the transmission line, the device is tolerant to mismatch between individual lines. In the power combiner, the individual secondary windings generate an azimuthal field to couple power in to the transmission line. Effectively the field from each loop or winding adds and the total azimuthal field generated is the sum of the individual contributions. FIG. **9** shows an example of such a power combiner, where a single low power frequency source **900** is coupled to a plurality n of different gain devices **910** G_1, G_2, G_n each operating at the same frequency which are then coupled together using a power combiner **920** to provide a high power output **930**. While tuning stubs are not provided in this schematic, it will be understood that they may or may not be required depending on the application.

[0054] It will be understood that heretofore the operation of a device providing for the coupling of power/signals from a plurality of secondary windings onto a transmission line or vice versa has been described with reference to either alternative a device in accordance with the present teaching could be used to provide a combined combiner-splitter where two or more individual signals are combined onto the transmission line and then split again to provide a feed for two or more output lines. FIG. **10** shows an example of such an arrangement **1000** which is based on the power combiner of FIG. **9**. As opposed to provide a single output, as was provided in FIG. **9**, in this arrangement a second former **1020** is provided on the opposing end of the transmission line **116** to that of the former providing the support for the secondary windings at the input end. This second former **1020** provides a support for a second set of secondary windings, these being within the azimuthal magnetic field of the transmission line **116** and coupling the power introduced at the first end out of the device to a plurality of individual outputs **1010** (o/p**1**, o/p**2**, o/p**3**, o/p**4**). While tuning stubs are not provided in this schematic, it will be understood that they may or may not be required depending on the application.

[0055] Additionally, in a preferred embodiment the power combiner is configured such that the input loops are tuned to a very narrow bandwidth such that different loops can be operated at different frequencies without interacting with other input loops. In this way multiple frequencies can be coupled into a single transmission line. The input loops may be tuned by adding a capacitor between the input pair of wires forming a series L-C resonator at w^2=1/(L*C) where w is the angular frequency of the resonator, L is the inductance of the input loop, and C is the capacitor across the input wire pair. It will be appreciated by those skilled in the art that stray capacitance and inductance may shift the actual resonant frequency. Employing a variable capacitor would allow the resonant frequency to be tuned in-situ. As would be known by those skilled in the art, multiple components could be used to affect the narrow resonance, including adding a filter external to the power splitter. In this way multiple frequencies can be coupled into a single transmission line. Such an application is particularly advantageous in TV and radio broadcast system where there is a desire to provide for broadcasting of such multiple frequencies—individual frequencies being associated with individual channels.

[0056] While it is not intended to limit the present teaching in any way it will be appreciated that a power splitter of the present specification has a number of advantages for applications as an electrode power source for plasma generation. The arrangement provides a truly broadband source with an operation range for example, to the order of 80 to 400 MHz. In the prior art often a single frequency splitter was provided for use with a dedicated coupling module for coupling power to the electrodes at a single frequency such an arrangement could not handle multiple frequencies. If a different frequency was to be applied then a further dedicated power module was required. The present arrangement provides excellent flexibility in the generation of plasmas and the control thereof by providing a broadband source. It is known that a plasma source operated at different frequencies can be optimized for different process steps, for example different steps in the manufacturing of an integrated circuit. Previously, different chambers, operated at different frequencies,