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(54) **HIGH FREQUENCY FILTER**

HOCHFREQUENZFILTER

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Description

TECHNICAL FIELD

[0001] Embodiments of the present invention relate to the communication field, and in particular, to a high-frequency filter.

BACKGROUND

[0002] A filter is widely used in the modern communication field, and a basic function is: making useful signals pass on a signal link to the greatest extent, and suppressing harmful signals to the greatest extent. Classified by structure, existing high-frequency filters include micro-strip filters, strip line filters, and coaxial resonant cavity filters. A basic structural feature of a micro-strip filter is a base made of a dielectric material, where a metal conductor is laid on one surface of the base, and there is a grounded metal conductor layer at an opposite position on the other surface. A basic structural feature of a strip line filter is that a metal conductor is suspended or laid on a support made of a dielectric material, and metal conductors at corresponding positions on the top and bottom of the conductor form an outer conductor. For a coaxial resonant cavity filter, a metal conductor is placed in an enclosed metal cavity of the filter, and both ends of the conductor are coupled with the metal cavity, where coupling strength and/or an electrical length of the metal conductor determines a resonant frequency. The coaxial resonant cavity filter provided in the prior art has a main feature that, the coaxial resonant cavity filter has many tuning structures. For example, each coaxial resonant cavity has a screw for adjusting a frequency, and there is also a screw for adjusting coupling between one coaxial resonant cavity and another coaxial resonant cavity. Since these screws are associated with each other, the coaxial resonant cavity filter provided in the prior art cannot ensure consistency of indexes such as filter standing wave, phase, and group delay.

[0003] WO 2005/091426 A1 discloses an arrangement for dividing the output signal of the antenna filter of a radio receiver to two different paths, such as two parallel low-noise amplifier branches of a base station. The divider circuit is physically integrated into a resonator-type antenna filter. This takes place by placing some conductors of the divider inside some conductive part of the filter structure or the resonator cavity and by using the coupling conductor of the output resonator as part of the input line of the divider at the same time. As the divider is used a Wilkinson divider. Due to the arrangement, a transmission line between the antenna filter and the divider becomes unnecessary, and the dielectric losses of the divider are reduced as compared to the prior art, in which case correspondingly inferior noise qualities can be allowed for low-noise amplifiers.

[0004] US 2002/0145490 A1 discloses a cavity filter assembly being provided with at least one structural cav-

ity wall comprising a circuit board. The circuit board may also contain other circuits and circuit elements such as trim capacitors, inductors, low noise amplifier circuits and power amplifiers that are part of the filter's function. Input and output coupling structures and connectors may also be provided on the circuit board. The circuit board may contain inter-stage coupling circuits, signal traces, and coupling pads/structures. Further embodiments are provided that incorporate test connectors and directional couplers on the circuit board. In yet other embodiments the filter's electrical characteristics are tunable with trim elements mounted on the circuit board, such as capacitors or inductors, in either mechanical or electrical manner.; The filter's electrical characteristics may also be tunable with mechanical elements mounted through the circuit board.

[0005] EP 0859 422 A1 discloses a coaxial resonator filter comprising a dielectric boardlike element and on its surface at least one electrically conductive element to provide an electromagnetic coupling to at least one coaxial resonator. The dielectric boardlike element may be the same as the filter's base plate, in which case its outer surface comprises a continuous earth plane, or it may be parallel to a separate electrically conductive base plate. Link, tap and capacitive coupling elements can be realised on the surface of the dielectric board.

SUMMARY

[0006] Embodiments of the present invention provide a high-frequency filter, in order to ensure consistency of indexes of the filter.

[0007] The embodiments of the present invention provide a high-frequency filter. The high-frequency filter includes: at least one coaxial resonant cavity, at least one printed circuit board arranged at the coaxial resonant cavity, and at least one intracavity conductor on a side of the printed circuit board. A metal conductor layer for performing signal connection for a source and a load is laid on a surface of the printed circuit board, and a grounded metal conductor layer is laid on the other surface opposite to the surface laid with the metal conductor layer. One end of the intracavity conductor and the coaxial resonant cavity are both grounded. The intracavity conductor and the metal conductor layer for performing signal connection for the source and the load are coupled. The printed circuit board covers a cavity opening of the coaxial resonant cavity, and the high-frequency filter further comprises at least one U-shaped coupling piece arranged inside the coaxial resonant cavity, wherein one end of the U-shaped coupling piece is connected to the metal conductor layer for performing signal connection for the source and the load, and the other end is connected to the grounded metal conductor layer and the intracavity conductor is a columnar intracavity conductor, one end of the columnar intracavity conductor contacts with a side wall of the coaxial resonant cavity, and the surface of the printed circuit board laid with the metal conductor layer

for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer is parallel to an axial direction or a center line direction of the columnar intracavity conductor..

[0008] It can be known from the high-frequency filter provided in the above embodiments of the present invention that, each coaxial resonant cavity of the high-frequency filter is provided with at least one printed circuit board and at least one intracavity conductor on a side of the printed circuit board. Since the printed circuit board has high machining precision, and can ensure batch consistency of indexes such as filter standing wave, phase, and group delay, a volume of the filter can be reduced in comparison to an air strip line because of a relatively high dielectric constant of the printed circuit board.

BRIEF DESCRIPTION OF DRAWINGS

[0009] To describe the technical solutions in the embodiments of the present invention more clearly, the following briefly introduces the accompanying drawings required for describing the prior art or the embodiments. Apparently, the accompanying drawings in the following description show merely some embodiments of the present invention, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings.

FIG. 1a is a schematic structural diagram of a high-frequency filter provided in Embodiment 1 of the present invention;

FIG. 1b is a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity of the high-frequency filter shown in FIG. 1a; FIG. 2a is a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity of a high-frequency filter provided in example 1 of the present invention;

FIG. 2b is another schematic diagram of the structure and the relative position of each part in the coaxial resonant cavity of the high-frequency filter provided in example 1 of the present invention;

FIG. 3 is a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity of a high-frequency filter provided in example 2 of the present invention;

FIG. 4 is a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity of a high-frequency filter provided in example 3 of the present invention; and

FIG. 5 is a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity of a high-frequency filter.

DESCRIPTION OF EMBODIMENTS

[0010] The following clearly and completely describes the technical solutions in the embodiments of the present

invention with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are merely a part rather than all of the embodiments of the present invention. All other embodiments obtained by a person skilled in the art based on the embodiments of the present invention shall fall within the protection scope of the present invention.

[0011] A high-frequency filter provided in the embodiments of the present invention includes at least one coaxial resonant cavity, at least one printed circuit board (Printed Circuit Board, PCB) arranged at the coaxial resonant cavity, and at least one intracavity conductor on a side of the printed circuit board. One end of the intracavity conductor and the coaxial resonant cavity are both grounded. A metal conductor layer for performing signal connection for a source and a load is laid on a surface of the printed circuit board, and a grounded metal conductor layer is laid on the other surface opposite to the surface laid with the metal conductor layer for performing signal connection for the source and the load. Further, the intracavity conductor and the metal conductor layer for performing signal connection for the source and the load are coupled.

[0012] Referring to FIG. 1a, FIG. 1a is a schematic structural diagram of a high-frequency filter provided in Embodiment 1 of the present invention. The high-frequency filter shown in FIG. 1a includes at least one grounded coaxial resonant cavity 101, at least one U-shaped coupling piece 103, at least one columnar intracavity conductor 104, and at least one printed circuit board 102 covering a cavity opening of the coaxial resonant cavity 101.

[0013] FIG. 1b shows a schematic diagram of a structure and a relative position of each part of the coaxial resonant cavity of the high-frequency filter shown in FIG. 1a. A metal conductor layer 105 for performing signal connection for a source and a load is laid on a surface of the printed circuit board 102, and a grounded metal conductor layer is laid on the other surface opposite to the surface laid with the metal conductor layer 105 for performing signal connection for the source and the load. In this embodiment, for the other surface opposite to the surface laid with the metal conductor layer 105 for performing signal connection for the source and the load, the grounded metal conductor layer may be laid on the whole surface, or the grounded metal conductor layer is at least laid on a portion contacting with the coaxial resonant cavity 101. In this way, the coaxial resonant cavity 101 is also grounded. In addition to ensuring signal circulation, the metal conductor layer 105 for performing signal connection for the source and the load may further have a function of coupling a signal connected by the metal conductor layer 105 to the columnar intracavity conductor 104. A screw 106 arranged on the columnar intracavity conductor 104 is configured to adjust a frequency.

[0014] The columnar intracavity conductor 104 may be fixed on a cavity wall of the coaxial resonant cavity 101, and one end of the columnar intracavity conductor 104

contacts with a side wall of the coaxial resonant cavity 101 to implement grounding. An axial direction or a center line direction of the columnar intracavity conductor 104 is parallel to the surface of the printed circuit board 102 laid with the metal conductor layer 105 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer. For example, if the columnar intracavity conductor 104 is a cylindrical intracavity conductor, the axial direction of the columnar intracavity conductor 104 is parallel to the surface of the printed circuit board 102 laid with the metal conductor layer 105 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer; and if the columnar intracavity conductor 104 is a prismatic intracavity conductor, the center line direction of the columnar intracavity conductor 104 is parallel to the surface of the printed circuit board 102 laid with the metal conductor layer 105 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer.

[0015] One end of the U-shaped coupling piece 103 is connected to the metal conductor layer 105, and the other end is connected to the grounded metal conductor layer. The function of the U-shaped coupling piece 103 is similar to that of an inductor. A magnetic field generated by the U-shaped coupling piece 103 excites a magnetic field of the coaxial resonant cavity 101. The columnar intracavity conductor 104 is coupled with the metal conductor layer 105 for performing signal connection for the source and the load via the magnetic field in the coaxial resonant cavity 101 excited by the U-shaped coupling piece 103, and this type of coupling is also called inductance coupling.

[0016] A high-frequency filter provided in example 1 of the present invention includes at least one grounded coaxial resonant cavity, at least one printed circuit board covering a cavity opening of the coaxial resonant cavity, and at least one U-shaped intracavity conductor.

[0017] FIG. 2a shows a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity 201 of the high-frequency filter provided in example 1. A metal conductor layer 204 for performing signal connection for a source and a load is laid on a surface of the printed circuit board 202, and a grounded metal conductor layer is laid on the other surface opposite to the surface laid with the metal conductor layer 204 for performing signal connection for the source and the load. In this example, for the other surface opposite to the surface laid with the metal conductor layer 204 for performing signal connection for the source and the load, the grounded metal conductor layer may be laid on the whole surface, or the grounded metal conductor layer is at least laid on a portion contacting with the coaxial resonant cavity 201. In this way, the coaxial resonant cavity 201 is also grounded. In addition to ensuring signal circulation, the metal conductor layer 204 for performing signal connection for the source and the load may further have

a function of coupling a signal connected by the metal conductor layer 204 to a U-shaped intracavity conductor 203. The U-shaped intracavity conductor 203 may be curved prismatic or curved cylindrical. One end of the U-shaped intracavity conductor 203 contacts with the grounded metal conductor layer to implement grounding, and the other end is embedded in the printed circuit board 202, and does not contact with the metal conductor layer 204 for performing signal connection for the source and the load. A screw 205 arranged on the U-shaped intracavity conductor 203 is configured to adjust a frequency.

[0018] As another example of the present invention, in the high-frequency filter shown in FIG. 2a, the printed circuit board may further be arranged inside the coaxial resonant cavity 201, a cavity opening of the coaxial resonant cavity 201 may be shielded by using a shield plate, and the U-shaped intracavity conductor 203 may be curved cylindrical, as shown in FIG. 2b. One end of the U-shaped intracavity conductor 203 contacts with the grounded metal conductor layer laid on the printed circuit board 202, and the other end is embedded in the printed circuit board 202, but does not contact with the metal conductor layer 204 for performing signal connection for the source and the load. A horizontal portion of the U-shaped intracavity conductor 203 is parallel to the surface of the printed circuit board 202 laid with the metal conductor layer 204 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer. In the high-frequency filter shown in FIG. 2a or FIG. 2b, since the U-shaped intracavity conductor 203 does not contact with the metal conductor layer 204 for performing signal connection for the source and the load, the U-shaped intracavity conductor 203 may be coupled with the metal conductor layer 204 for performing signal connection for the source and the load by using the printed circuit board 202 as a medium, and this type of coupling is capacitance coupling.

[0019] In the high-frequency filter shown in FIG. 2a or FIG. 2b, the structure and the relative position of each part in the coaxial resonant cavity may further be that: one end of the U-shaped intracavity conductor is connected to the grounded metal conductor layer, and the other end is embedded in the printed circuit board, and contacts with the metal conductor layer for performing signal connection for the source and the load. The horizontal portion of the U-shaped intracavity conductor is parallel to the surface of the printed circuit board laid with the metal conductor layer for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer. Since one end of the U-shaped intracavity conductor directly contacts with the metal conductor layer for performing signal connection for the source and the load, coupling between the U-shaped intracavity conductor and the metal conductor layer for performing signal connection for the source and the load is current coupling.

[0020] A high-frequency filter provided in example 2 of the present invention includes at least one grounded co-

axial resonant cavity, at least one L-shaped intracavity conductor, and at least one printed circuit board covering a cavity opening of the coaxial resonant cavity.

[0021] FIG. 3 shows a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity 301 of the high-frequency filter provided in example 2. A metal conductor layer 304 for performing signal connection for a source and a load is laid on a surface of a printed circuit board 302, and a grounded metal conductor layer is laid on the other surface opposite to the surface of the printed circuit board 302 laid with the metal conductor layer 304 for performing signal connection for the source and the load. In addition to ensuring signal circulation, the metal conductor layer 304 may further has a function of coupling a signal connected by the metal conductor layer 304 to an L-shaped intracavity conductor 303.

[0022] The L-shaped intracavity conductor 303 may be curved prismatic or curved cylindrical, and a screw 305 on it is configured to adjust a frequency. One end of a vertical portion of the L-shaped intracavity conductor 303 is embedded in the printed circuit board 302, but does not contact with the metal conductor layer 304 for performing signal connection for the source and the load. In this example, for the other surface opposite to the surface laid with the metal conductor layer 304 for performing signal connection for the source and the load, the grounded metal conductor layer may be laid on the whole surface, or the grounded metal conductor layer is at least laid on a portion contacting with the coaxial resonant cavity 301. In this way, the coaxial resonant cavity 301 is also grounded. One end of a horizontal portion of the L-shaped intracavity conductor 303 contacts with a side wall of the coaxial resonant cavity 301. Since the coaxial resonant cavity 301 is grounded, the end of the horizontal portion of the L-shaped intracavity conductor 303 is equivalent to being grounded. The horizontal portion of the L-shaped intracavity conductor 303 is parallel to the surface of the printed circuit board 302 laid with the metal conductor layer 304 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer.

[0023] In the high-frequency filter shown in FIG. 3, since the L-shaped intracavity conductor 303 does not directly contact with the metal conductor layer 304 for performing signal connection for the source and the load, the L-shaped intracavity conductor 303 may be coupled with the metal conductor layer 304 for performing signal connection for the source and the load by using the printed circuit board 302 as a medium, and this type of coupling is capacitance coupling.

[0024] In example 2 of the present invention, the structure and the relative position of each part in the coaxial resonant cavity may further be that: the end of the vertical portion of the L-shaped intracavity conductor is embedded in the printed circuit board, and contacts with the metal conductor layer for performing signal connection for the source and the load. In this example, for the other

surface opposite to the surface laid with the metal conductor layer for performing signal connection for the source and the load, the grounded metal conductor layer may be laid on the whole surface, or the grounded metal conductor layer is laid on the portion contacting with the coaxial resonant cavity. In this way, the coaxial resonant cavity is also grounded. The end portion of the horizontal portion of the L-shaped intracavity conductor contacts with the side wall of the coaxial resonant cavity. Since the coaxial resonant cavity is grounded, the end portion of the horizontal portion of the L-shaped intracavity conductor is equivalent to be grounded. The horizontal portion of the L-shaped intracavity conductor is parallel to the surface of the printed circuit board laid with the metal conductor layer for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer. Since the end of the vertical portion of the L-shaped intracavity conductor directly contacts with the metal conductor layer for performing signal connection for the source and the load, coupling between the L-shaped intracavity conductor and the metal conductor layer for performing signal connection for the source and the load is current coupling.

[0025] A high-frequency filter provided in example 3 of the present invention includes at least one grounded coaxial resonant cavity, at least one columnar intracavity conductor, at least one metal wire, and at least one printed circuit board covering a cavity opening of the coaxial resonant cavity.

[0026] FIG. 4 shows a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity 401 of the high-frequency filter provided in example 3. A columnar intracavity conductor 402 may be a cylindrical intracavity conductor or a prismatic intracavity conductor. A metal conductor layer 404 for performing signal connection for a source and a load is laid on a surface of a printed circuit board 403, and a grounded metal conductor layer is laid on the other surface opposite to the surface laid with the metal conductor layer 404 for performing signal connection for the source and the load, or the grounded metal conductor layer is at least laid on a portion contacting with the coaxial resonant cavity 401. In this way, the coaxial resonant cavity 401 is also grounded. In addition to ensuring signal circulation, the metal conductor layer 404 for performing signal connection for the source and the load may further has a function of coupling a signal connected by the metal conductor layer 404 to the columnar intracavity conductor 402. The columnar intracavity conductor 402 may be fixed in the coaxial resonant cavity 401, and one end of the columnar intracavity conductor 402 contacts with a side wall of the coaxial resonant cavity 401 to implement grounding. A screw 407 arranged on the columnar intracavity conductor 402 is configured to adjust a frequency.

[0027] One end of the metal wire 406 is connected to the columnar intracavity conductor 402, and the other end is connected to the metal conductor layer 404 for performing signal connection for the source and the load.

The relative relation between the printed circuit board 403 and the columnar intracavity conductor 402 may be that: the surface of the printed circuit board 403 laid with the metal conductor layer 404 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer is parallel to an axial direction or a center line direction of the columnar intracavity conductor 402. For example, if the columnar intracavity conductor 402 is a cylindrical intracavity conductor, the surface of the printed circuit board 403 laid with the metal conductor layer 404 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer is parallel to the axial direction of the columnar intracavity conductor 402; and if the columnar intracavity conductor 402 is a prismatic intracavity conductor, the surface of the printed circuit board 403 laid with the metal conductor layer 404 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer is parallel to the center line direction of the columnar intracavity conductor 402.

[0028] Since the columnar intracavity conductor 402 is connected to the metal conductor layer 404 for performing signal connection for the source and the load via the metal wire 406, coupling between the columnar intracavity conductor 402 and the metal conductor layer 404 for performing signal connection for the source and the load is current coupling.

[0029] A high-frequency filter provided in another example includes at least one grounded coaxial resonant cavity, at least one columnar intracavity conductor, and at least one printed circuit board arranged inside the coaxial resonant cavity.

[0030] FIG. 5 shows a schematic diagram of a structure and a relative position of each part in a coaxial resonant cavity 501 of the high-frequency filter. A metal conductor layer 504 for performing signal connection for a source and a load is laid on a surface of a printed circuit board 503, and a grounded metal conductor layer is laid on the surface opposite to the surface laid with the metal conductor layer 504 for performing signal connection for the source and the load. The grounded metal conductor layer contacts with a side wall of the coaxial resonant cavity. A columnar intracavity conductor 502 may be a cylindrical intracavity conductor or a prismatic intracavity conductor, and one end of it contacts with the coaxial resonant cavity 501. Since the grounded metal conductor layer contacts with the side wall of the coaxial resonant cavity 501, the end of the columnar intracavity conductor 502 that contacts with the coaxial resonant cavity 501 is equivalent to being grounded. In addition to ensuring signal circulation, the metal conductor layer 504 for performing signal connection for the source and the load may further has a function of coupling a signal connected by the metal conductor layer 504 to the columnar intracavity conductor 502. A screw 505 arranged on the columnar intracavity conductor 502 is configured to adjust a frequency.

[0031] The relative relation between the printed circuit

board 503 and the columnar intracavity conductor 502 may be that: the surface of the printed circuit board 503 laid with the metal conductor layer 504 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer 505 is perpendicular to an axial direction or a center line (if the columnar intracavity conductor 502 is a prismatic intracavity conductor) direction of the columnar intracavity conductor 502. For example, if the columnar intracavity conductor 502 is a cylindrical intracavity conductor, the surface of the printed circuit board 503 laid with the metal conductor layer 504 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer 505 is perpendicular to the axial direction of the columnar intracavity conductor 502; and if the columnar intracavity conductor 502 is a prismatic intracavity conductor, the surface of the printed circuit board 503 laid with the metal conductor layer 504 for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer 505 is perpendicular to the center line direction of the columnar intracavity conductor 502.

[0032] Since the columnar intracavity conductor 502 directly contacts with the metal conductor layer 504 for performing signal connection for the source and the load, coupling between the columnar intracavity conductor 502 and the metal conductor layer 504 for performing signal connection for the source and the load is current coupling.

[0033] It can be known from the high-frequency filter provided in the above embodiments of the present invention that, each coaxial resonant cavity of the high-frequency filter is provided with at least one printed circuit board and at least one intracavity conductor on a side of the printed circuit board. Because the plate making craft can ensure dimensional precision of the metal conductor layer for performing signal connection for the source and the load within plus or minus 1 mil (milli-inch), a dimensional tolerance of the printed circuit board and a fluctuation range of the dielectric constant can be effectively controlled, and there is no assembly tolerance. This high consistency of the printed circuit board ensures that consistency of indexes of components of the printed circuit board structure is higher than that of components assembled through pure machining. Specifically, in the high-frequency filter provided in the embodiments of the present invention, the high consistency of the printed circuit board ensures batch consistency of indexes such as filter standing wave, phase, and group delay, and a volume of the filter can be reduced in comparison to an air strip line because of a relatively high dielectric constant of the printed circuit board.

[0034] The high-frequency filter provided in the embodiments of the present invention is introduced above in detail, specific cases are applied herein to elaborate the principle and implementation manners of the present invention, and the descriptions of the above embodiments are merely used to help understand the present invention. Meanwhile, a person of ordinary skill in the art

may change the specific implementation manners and the application scope based on the concept of the present invention. In conclusion, the contents in the specification should not be construed as limiting the independent claims.

Claims

1. A high-frequency filter, wherein the high-frequency filter comprises at least one coaxial resonant cavity(101), at least one printed circuit board(102) arranged at the coaxial resonant cavity(101), and at least one intracavity conductor(104) on a side of the printed circuit board(102), wherein a metal conductor layer(105) for performing signal connection for a source and a load is laid on a surface of the printed circuit board(102), a grounded metal conductor layer is laid on the other surface opposite to the surface laid with the metal conductor layer(105), and one end of the intracavity conductor(104) and the coaxial resonant cavity(101) are both grounded; and the intracavity conductor(104) and the metal conductor layer(105) for performing signal connection for the source and the load are coupled; wherein the printed circuit board covers a cavity opening of the coaxial resonant cavity, and the high-frequency filter further comprises at least one U-shaped coupling piece(103) arranged inside the coaxial resonant cavity, wherein one end of the U-shaped coupling piece is connected to the metal conductor layer for performing signal connection for the source and the load, and the other end is connected to the grounded metal conductor layer; and the intracavity conductor is a columnar intracavity conductor, one end of the columnar intracavity conductor contacts with a side wall of the coaxial resonant cavity, and the surface of the printed circuit board laid with the metal conductor layer for performing signal connection for the source and the load or the surface laid with the grounded metal conductor layer is parallel to an axial direction or a center line direction of the columnar intracavity conductor.
2. The high-frequency filter according to claim 1, wherein the coupling between the intracavity conductor and the metal conductor layer for performing signal connection for the source and the load is specifically that: the columnar intracavity conductor is coupled with the metal conductor layer for performing signal connection for the source and the load via a magnetic field in the coaxial resonant cavity excited by the U-shaped coupling piece.

Patentansprüche

1. Hochfrequenzfilter, wobei das Hochfrequenzfilter

wenigstens eine koaxiale Resonanzkavität (101), wenigstens eine Leiterplatte (102), die bei der koaxialen Resonanzkavität (101) angeordnet ist, und wenigstens einen Intrakavitätsleiter (104) auf einer Seite der Leiterplatte (102) umfasst, wobei eine Metallleiterschicht (105) zum Durchführen einer Signalverbindung für eine Quelle und eine Last auf einer Oberfläche der Leiterplatte (102) aufgebracht ist, eine mit Masse verbundenen Metallleiterschicht auf der anderen Oberfläche, die der Oberfläche mit der aufgetragenen Metallleiterschicht (105) gegenüberliegt, aufgebracht ist und sowohl ein Ende des Intrakavitätsleiters (104) als auch die koaxiale Resonanzkavität (101) mit Masse verbunden sind; und der Intrakavitätsleiter (104) und die Metallleiterschicht (105) zum Durchführen einer Signalverbindung für die Quelle und die Last gekoppelt sind; wobei die Leiterplatte eine Kavitätsöffnung der koaxialen Resonanzkavität bedeckt und das Hochfrequenzfilter ferner wenigstens ein U-förmiges Kopplungsstück (103) umfasst, das innerhalb der koaxialen Resonanzkavität angeordnet ist, wobei ein Ende des U-förmigen Kopplungsstücks mit der Metallleiterschicht zum Durchführen einer Signalverbindung für die Quelle und die Last verbunden ist und das andere Ende mit der mit Masse verbundenen Metallleiterschicht verbunden ist; und der Intrakavitätsleiter ein säulenartiger Intrakavitätsleiter ist, ein Ende des säulenartigen Intrakavitätsleiters eine Seitenwand der koaxialen Resonanzkavität kontaktiert und die Oberfläche der Leiterplatte mit der aufgetragenen Metallleiterschicht zum Durchführen der Signalverbindung für die Quelle und die Last oder die Oberfläche mit der aufgetragenen mit Masse verbundenen Metallleiterschicht parallel zu einer axialen Richtung oder einer Mittellinienrichtung des säulenartigen Intrakavitätsleiters ist.

2. Hochfrequenzfilter nach Anspruch 1, wobei die Kopplung zwischen dem Intrakavitätsleiter und der Metallleiterschicht zum Durchführen einer Signalverbindung für die Quelle und die Last speziell darin besteht, dass: der säulenartige Intrakavitätsleiter mit der Metallleiterschicht zum Durchführen einer Signalverbindung für die Quelle und die Last über ein Magnetfeld in der koaxialen Resonanzkavität, welches durch das U-förmige Kopplungsstück angeregt wird, gekoppelt wird.

Revendications

1. Filtre haute fréquence, le filtre haute fréquence comprenant au moins une cavité résonnante coaxiale (101), au moins une carte de circuit imprimé (102) disposée au niveau de la cavité résonnante coaxiale (101), et au moins un conducteur intracavité (104) sur un côté de la carte de circuit imprimé (102), dans

lequel une couche conductrice métallique (105) destinée à effectuer une connexion de signal pour une source et une charge est déposée sur une surface de la carte de circuit imprimé (102), une couche conductrice métallique mise à la terre est déposée sur l'autre surface à l'opposé de la surface recouverte avec la couche conductrice métallique (105), et une extrémité du conducteur intracavité (104) et la cavité résonnante coaxiale (101) sont toutes deux mises à la terre ; et

le conducteur intracavité (104) et la couche conductrice métallique (105) destinée à effectuer une connexion de signal pour la source et la charge sont couplés ;

dans lequel la carte de circuit imprimé recouvre une ouverture de cavité de la cavité résonnante coaxiale, et le filtre haute fréquence comprend en outre au moins une pièce de couplage en forme de U (103) disposée à l'intérieur de la cavité résonnante coaxiale, une extrémité de la pièce de couplage en forme de U étant reliée à la couche conductrice métallique destinée à effectuer une connexion de signal pour la source et la charge, et l'autre extrémité étant reliée à la couche conductrice métallique mise à la terre ; et le conducteur intracavité est un conducteur intracavité colonnaire, une extrémité du conducteur intracavité colonnaire est en contact avec une paroi latérale de la cavité résonnante coaxiale, et la surface de la carte de circuit imprimé recouverte avec la couche conductrice métallique destinée à effectuer une connexion de signal pour la source et la charge ou la surface recouverte avec la couche conductrice métallique mise à la terre est parallèle à une direction axiale ou une direction de ligne médiane du conducteur intracavité colonnaire.

2. Filtre haute fréquence selon la revendication 1, dans lequel le couplage entre le conducteur intracavité et la couche conductrice métallique destinée à effectuer une connexion de signal pour la source et la charge est spécifiquement que : le conducteur intracavité colonnaire est couplé avec la couche conductrice métallique destinée à effectuer une connexion de signal pour la source la charge par le biais d'un champ magnétique dans la cavité résonnante coaxiale excité par la pièce de couplage en forme de U.

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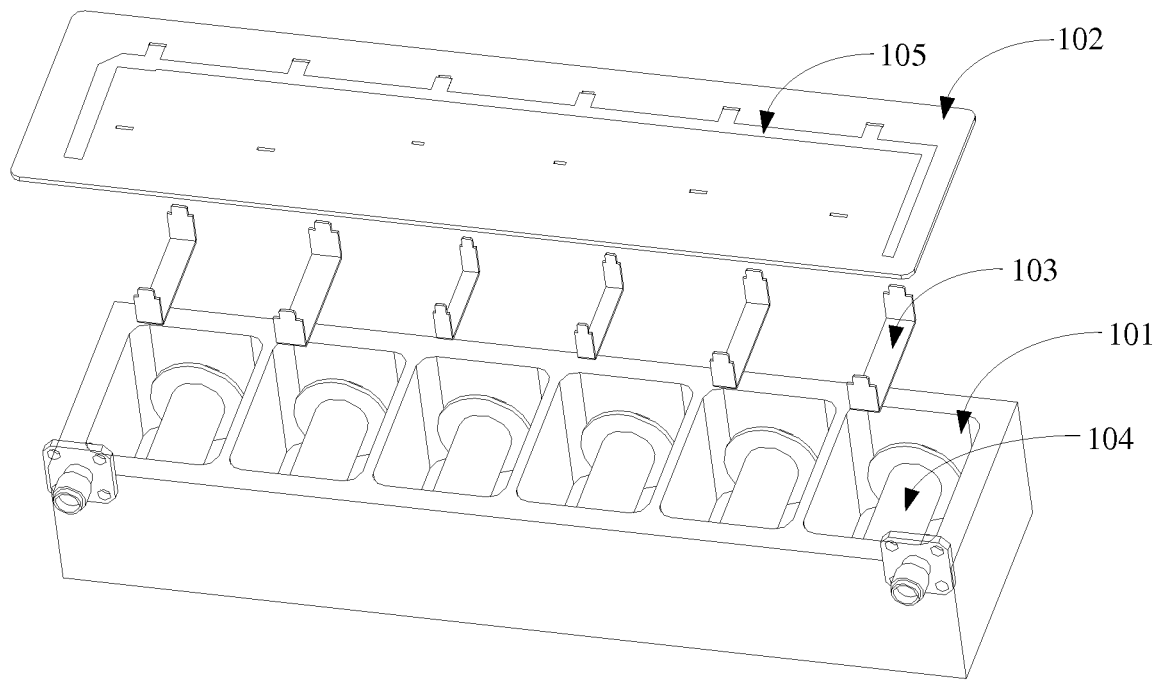


FIG. 1a

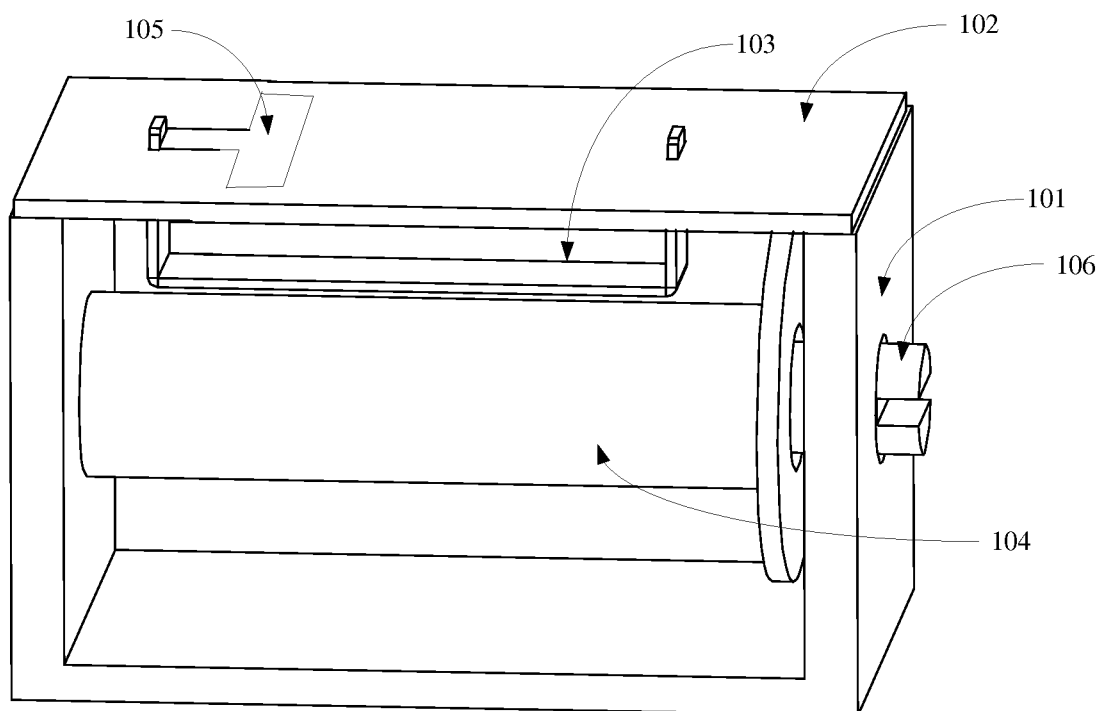


FIG. 1b

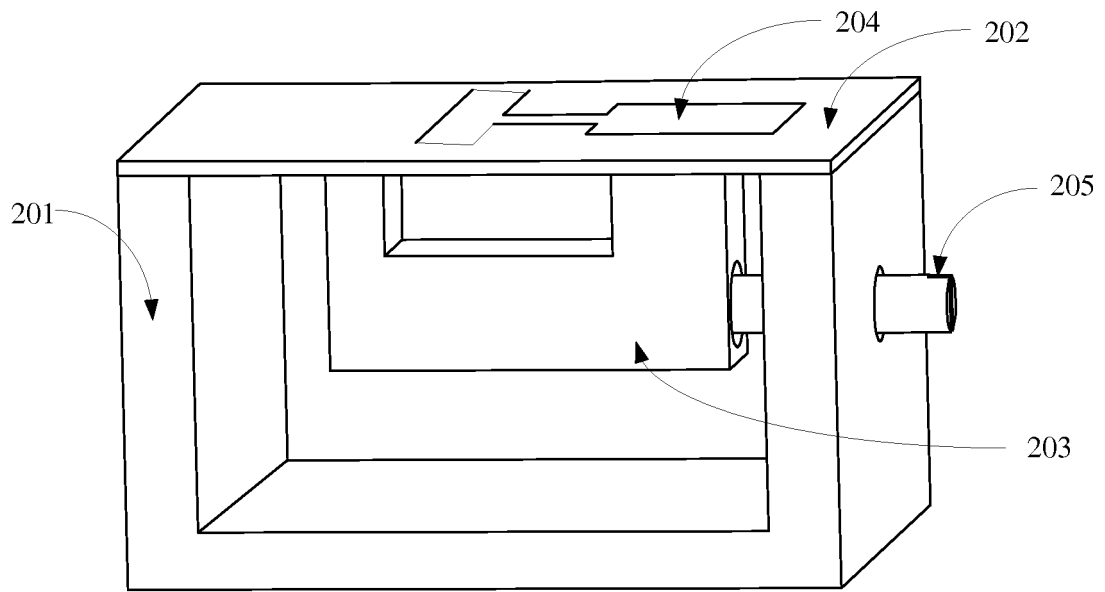


FIG. 2a

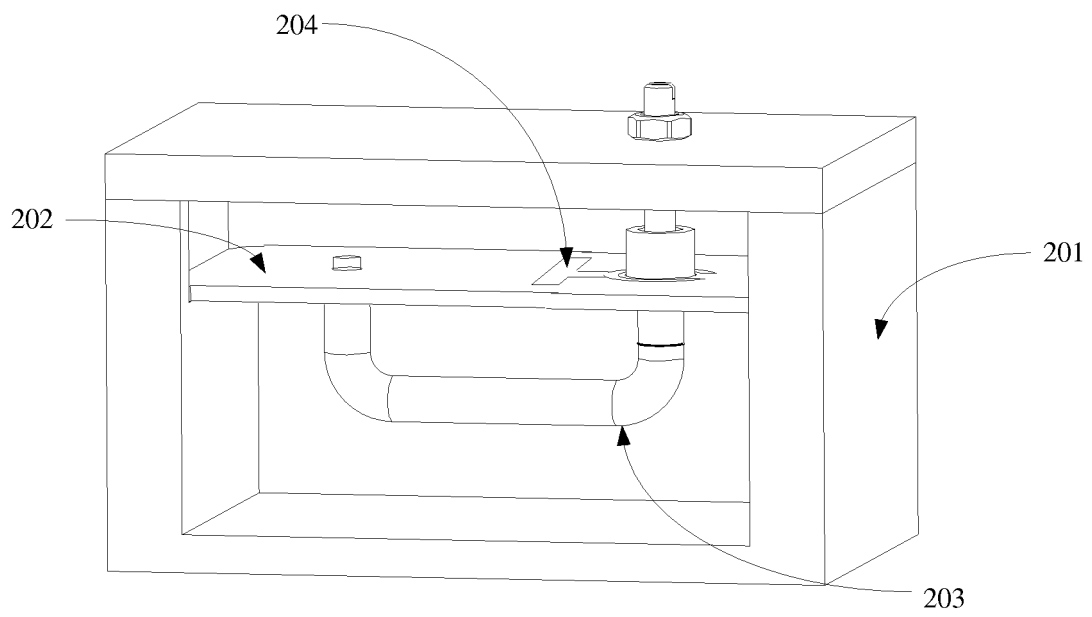


FIG. 2b

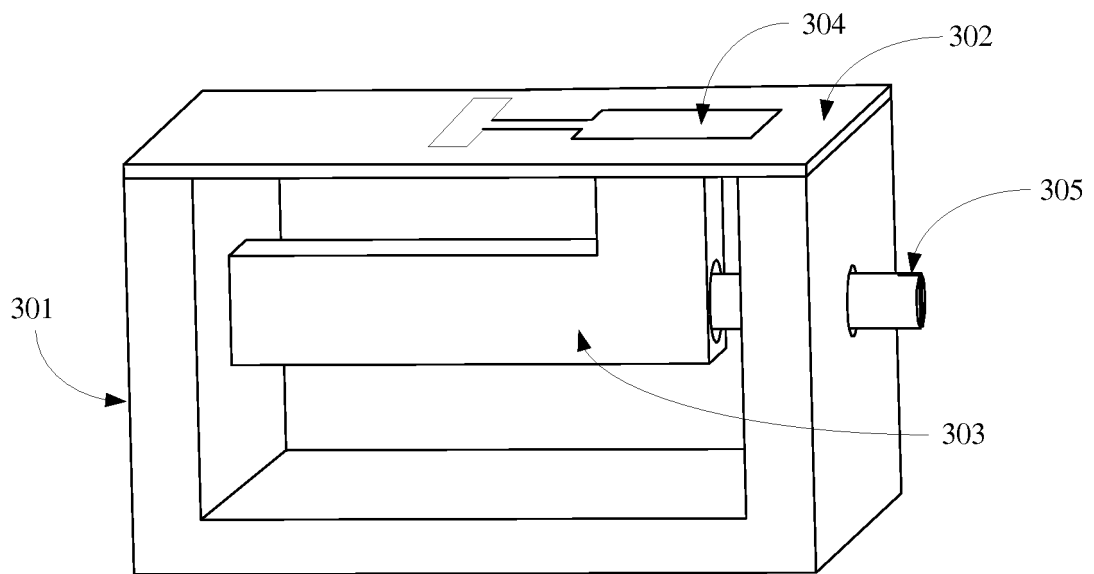


FIG. 3

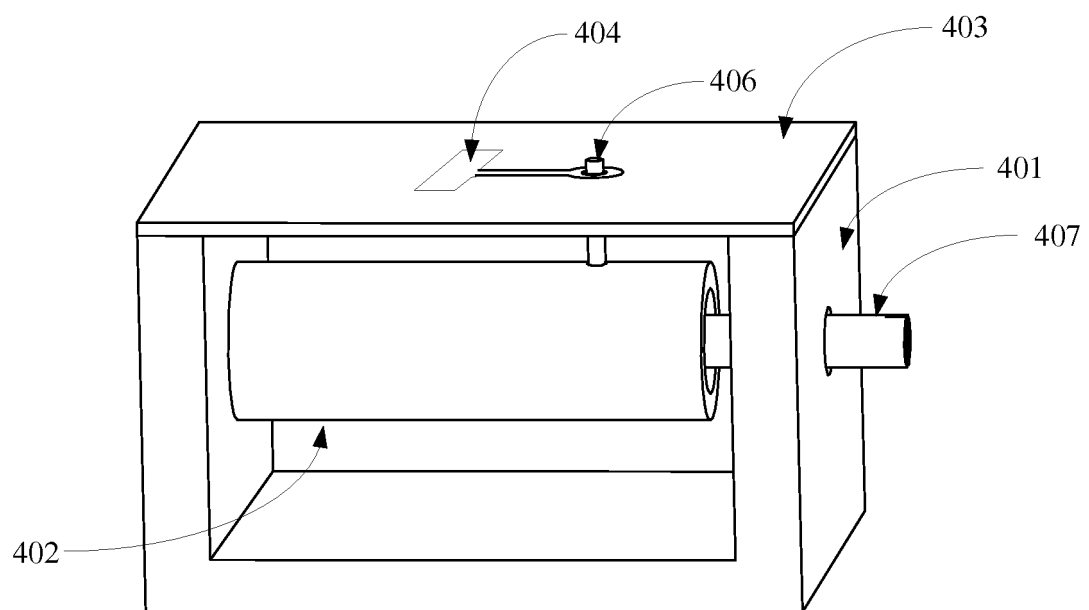


FIG. 4

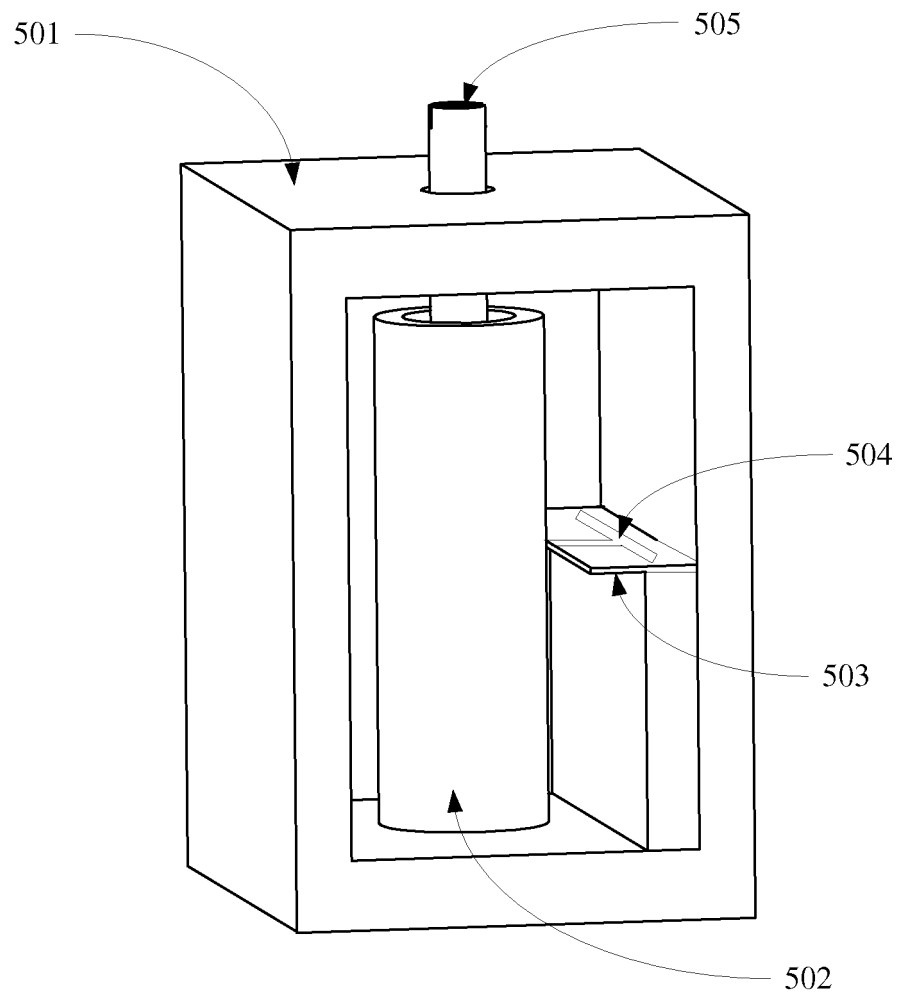


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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