

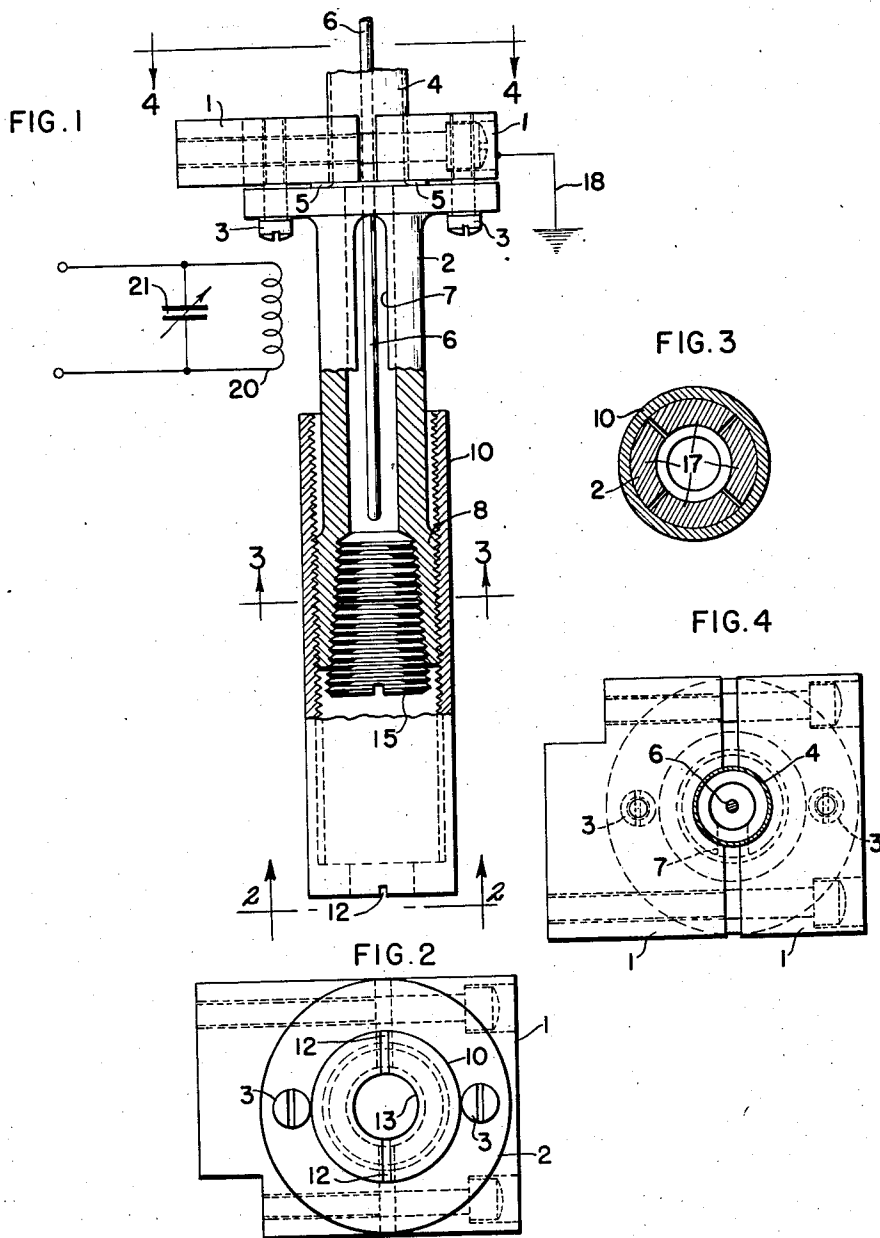
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COUPLING DEVICE

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COUPLING DEVICE

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3 Claims. (Cl. 178-44)

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This invention pertains generally to radio frequency communication circuits and more particularly to a device for coupling such circuits to a coaxial cable transmission line.

Conventional high-frequency radio communication circuits include various types of coupling devices for inductively and capacitively coupling vacuum tube circuits to coaxial cables. Difficulty has been experienced in providing coupling structure such that an efficient ground is provided for the outer conductor of a coaxial cable. If an efficient ground is not provided there occurs, in high-frequency radio circuits, excessive radiation of energy and interference with adjacent radio energy receivers. Furthermore, difficulty has been experienced in providing an easily adjustable coupling device for accurately obtaining an exact degree of coupling between vacuum tube circuits and the coaxial cable. Even though adjustable coupling devices are known, none has as yet been provided which is so constructed that its adjustment can be maintained despite serious vibration.

One well known adjustable coupling device includes a pair of plate members one of which is fixed with relation to an axial conductor of a coaxial cable and the other of which may be variably spaced from the axial conductor by means of an arrangement of gears adapted to be manually operated. This arrangement is inherently expensive to build and it is difficult to provide an efficient ground for the outer conductor of the coaxial cable.

The principal object of this invention is to provide, in a high-frequency radio communication circuit, a coupling device particularly adapted for use with coaxial cable.

A further object of this invention is to provide, in a high-frequency radio communication circuit, a coupling device which is easily adjustable to an exact degree and which maintains its adjustment despite the effects of excessive vibration.

A still further object of this invention is to provide, in a high-frequency radio communication circuit, a coupling device particularly adapted to provide an effective ground connection to a coaxial cable and which is inexpensive to construct.

In accordance with this invention, there is provided an adjustable coupling device particularly adapted for use in high-frequency radio communication circuits in connection with a coaxial cable comprising a split base member for receiving and clamping the outer conductor of a coaxial cable, a slotted stud member adapted to re-

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ceive the axial conductor of the cable and to clamp the turned-over end of the outer conductor to the aforementioned base member to thereby provide an efficient ground. The slotted member is threaded to receive a cylindrical shield which may be rotated to either completely enclose the slotted member or partially and exactly expose the slot and the axial conductor to a variable degree to thereby vary the coupling between the axial conductor and the output circuit of a vacuum tube. The slotted member is split and internally threaded to receive a threaded plug which, when tightened, may spread the slotted member into tight engagement with the shield to thereby prevent change of adjustment.

For a better understanding of the invention, together with other and further objects thereof, reference is had to the following description, taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

In the accompanying drawing, Fig. 1 shows a plan view partly in section, of the coupling device provided in accordance with this invention.

Fig. 2 is an end view of Fig. 1 from the direction indicated by arrows 2-2 in Fig. 1.

Fig. 3 is a cross-section on line 3-3 of Fig. 1.

Fig. 4 is an end view of Fig. 1 from the direction indicated by arrows 4-4 in Fig. 1.

Referring particularly to Fig. 1 of the drawing, there is shown a coupling member constructed in accordance with this invention, comprising a non-magnetic split base member 1 which is adapted to be secured to a chassis such as is customarily provided in radio apparatus, and to clamp the outer conductor of a coaxial cable. A slotted non-magnetic stud 2 is secured by the bolts 3 to base 1 and the slotted stud clamps the turned-over edges 5 of the outer conductor 4 of a coaxial cable to the base 1. The inner or axial conductor 6 of the coaxial cable extends through the base 1 into stud 2 as illustrated in the drawing. There is provided in stud 2 a slot 7 for exposing conductor 6 as will be described hereinafter. Stud 2 is threaded at 8 to receive the non-magnetic shield 10 which is also threaded to provide an exact and easily adjustable means for enclosing the stud 2 and the inner conductor 6 of the coaxial cable to whatever degree is desired in the particular radio circuit in which the device is to be utilized. Shield 10 is slotted as shown at 12 in Figs. 1 and 2 whereby it may be adjusted by means of a screw driver. There is also provided an opening 13 in shield 10 which provides access to a tapered screw threaded lock-

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nut 15 which is in threaded engagement with the stud 2. The locknut 15, when tightened to a certain degree, spreads the stud 2 by reason of the fact that it is split into sectors 17, as shown in Fig. 3, thereby to provide a vibration-proof adjustment between the shield 10 and stud 2. All of the parts described above may be constructed of brass, for example.

There is also shown in Fig. 1, the output of a vacuum tube circuit comprising a coil 20 and an adjustable condenser 21 which may be positioned in energy-transferring relation to the axial conductor 6. This circuit is shown by way of example only, as it will be obvious to those skilled in the art, that other forms of output circuits may also be utilized in connection with a coupling device of the nature disclosed herein.

This invention provides a very efficient coupling device for use in ultra high-frequency circuits for the reason that base member 1 may be mounted securely to the chassis of radio apparatus.

The chassis is customarily kept at ground potential and, therefore, the end of the coaxial cable adjacent the coupling member is provided with a very efficient ground such as indicated at 18 in Fig. 1. By providing such a ground, the potential between the outer conductor 4 and ground, is maintained at a very low value whereby radiation of energy from the cable is reduced to a minimum.

The coupling between the axial conductor 6 and coil 20, may be varied by rotating shield 10 to partially enclose or expose the axial conductor 6 and permit only a predetermined flow of flux between the axial conductor and coil 20. Thus, there is obtained a desired degree of coupling. When the shield has once been adjusted to the desired position, the locknut 15 may be rotated to impart lateral force to the sectors 17 of stud 2 whereby they spread into positive engagement with the shield 10. This creates a considerable amount of friction between the stud 2 and the shield 10 whereby its position cannot change under the effects of vibration.

It is not intended that this invention shall be limited to use with a coaxial cable since it will be obvious to those skilled in the art that other forms of conductors may be connected with a coupling device constructed in accordance with this invention. However, this invention does provide a very efficient ground for coaxial cable circuits.

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While there has been described what is at present considered the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A coupling device for use in connection with an electrical conductor comprising a base, a slotted stud secured at one end to said base for receiving said conductor and exposing it to an electrical field, the other end of said stud being split, a rotatable, nonmagnetic shield surrounding said stud and threaded thereto for variably shielding said conductor from said field, and means for expanding said stud whereby said shield may be locked to said stud.

2. A coupling device for use in connection with a coaxial cable comprising a base member adapted to receive the outer conductor of said cable, a slotted stud secured at one end to said base for receiving the inner conductor of said coaxial cable and exposing it to an electrical field, the other end of said stud being split into sectors, a cylindrical, rotatable, nonmagnetic shield surrounding said stud and threaded thereto to provide for adjustment of said shield whereby to variably shield said inner conductor from said field, and means for spreading said sectors whereby said shield may be locked to said stud.

3. A coupling device for use in connection with a coaxial cable comprising a base member adapted to clamp to the outer conductor of said cable, a slotted stud secured at one end to said base for clamping the turned-over end of said outer conductor to said base and receiving the inner conductor of said coaxial cable to expose it to an electrical field, the other end of said stud being split into sectors, a cylindrical, nonmagnetic shield surrounding said stud and threaded thereto adjacent said sectors to provide for adjustment of said shield whereby to variably shield said inner conductor from said field and a tapered locknut threaded into said other end of said stud whereby said shield may be locked to said stud when said locknut is tightened to spread the sectors of said stud.

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