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STEP ATTENUATOR SWITCH

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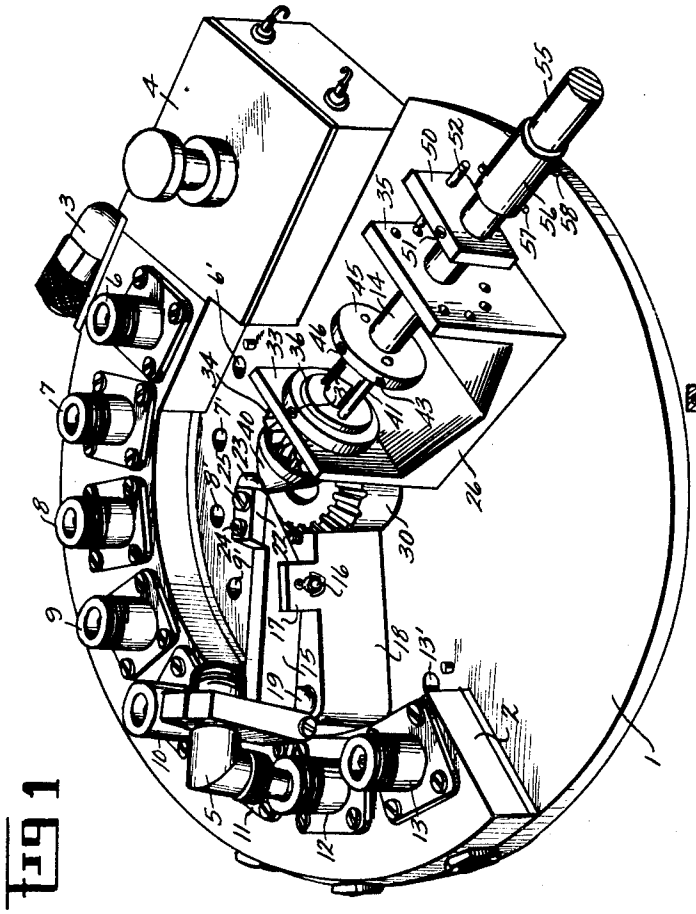


Fig 1

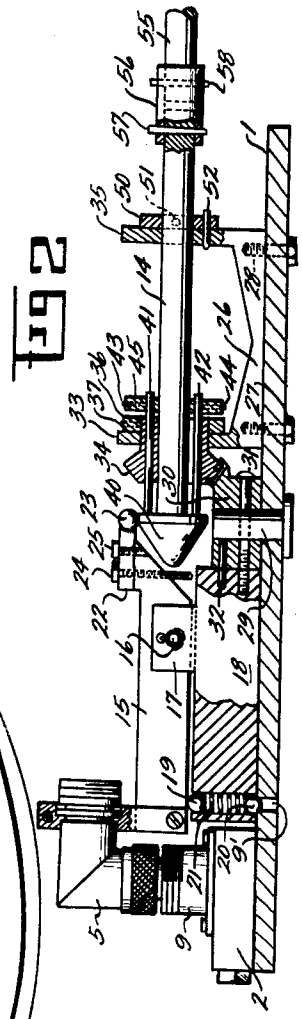


Fig 2

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STEP ATTENUATOR SWITCH

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1 Claim. (Cl. 200—4)

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This invention relates to an electronics device and more particularly to a step attenuator.

In the past attenuators of various type have been supplied to the trade and have had limitations that are minimized by the step attenuator described herein.

The present invention provides a step attenuator operable from outside a cabinet by rotational movements at right angles to each other for connecting and disconnecting electrical contacts such as coaxial fittings and the like.

An illustrative embodiment of the present invention is shown in the accompanying drawings wherein:

Figure 1 is a perspective view of a device that embodies the present invention with a contact broken; and

Figure 2 is a side elevation partly in section of the device in Figure 1 with a contact made.

In the accompanying drawings an insulation base 1 supports a cable and impedance containing hollow arc 2 that carries on its upper surface a desired plurality of contacts, here shown as the coaxial connector female fittings 6 to 12 inclusive, and on its outer side an input connector 3. The insulation base 1 also supports a diode housing 4 from which the input potential in the connector 3 may be applied to a potential indicating instrument, if desired.

The insulation base 1 also supports a mechanism having a control arm 14 extending to and operable from outside a cabinet housing the device, for selectively making and breaking connections between an output contact, here shown as a male fitting 5 on an arm 15, with one of the female fittings on the arc 2 for inserting a desired impedance in a circuit of which the device is a part.

The input connector 3 is a coaxial connector supplying to the device a radio frequency of a representative range of 40 to 400 megacycles per second. A direct connection through the device is provided when the connector male fitting 5 is seated within the coaxial female fitting 6. The remaining connector female fittings 7, 8, 9 etc. are adapted for inserting graduated increasing steps of attenuation in the circuit when the device output male fitting 5 is seated therein.

The connector male fitting 5 is adapted for making an axially directed slip fit into any of the female fittings 6, 7, 8, 9 etc. on the arc 2, when in registration therewith, on the depression of the left hand end of the male fitting bearing arm 15, as shown in Figure 2 of the drawings. The male fitting bearing arm 15 is pivoted on a

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pin 16 extending between a pair of ears 17 projecting upwardly from an arm supporting base 18.

The arm supporting base 18 is apertured at its left hand end to house a pair of balls 19 and 20 and a spring 21 maintained under compression therebetween. The upper friction ball 19 is supported by the spring 21 to seat within a small depression in the underside of the male fitting bearing arm 15 at its unattached end. The lower ball 20 serves as a registration indicating detent by slightly entering one of a number of holes in registration with and conforming in number with the number of female fittings on the arc 2. The holes in the base 1 are indicated by numerals corresponding with the female fittings with which they are in registration but the hole indicating numerals are primed.

The right hand end of the male fitting bearing arm 15 has plate 22 secured thereto by screws 24 and 25. The end of the plate 22 remote from the arm 15 preferably terminates in a ball portion 23. The screw 24, as shown, may extend through the arm 15 to engage the upper surface of the arm supporting base 18 to provide a controlled depression for the right hand end of the arm 15.

The insulation base 1 also supports a U-shaped anchor plate 26 that is secured to the base 1 by screws 27 and 28. The insulation base 1 has journalled therein at the center of the arc 2 a pin 29 on which a bevel gear 30 is maintained for rotation. A screw 31 passes through the pin 29 and the gear 30 and continues on into the base 18 of the male fitting carrying arm 15 to cause the arm 15 and base 18 to move together with the rotation of the gear 30. A pin 32 in the gear 30 and base 18 key these members against rotation around the screw 31.

The left hand ear 33 of the anchor plate 26 has journalled therein a bevel gear 34 that engages the first mentioned bevel gear 30. A stop washer 36 secured by a set screw 37 to the shaft of the bevel gear 34 maintains the gear 34 in rotatable relation with respect to the anchor plate ear 33.

The control arm 14 terminates at its left hand end in a conical tip 40. The control arm conical tip 40 is positioned to engage the ball 23 portion of the plate 22 carried by the male fitting bearing arm 15. Slide pins 41 and 42 have their left hand ends secured in the control arm conical tip 40 and extend parallel to the control arm 14 to make slip fits in the bevel gear 34. The right hand ends of the slide pins 41 and 42 are secured to a circular stop plate 45 by set screws 43 and

44, respectively. The stop plate 45 is non-rotatably secured to the control arm 14 by a set screw 46.

The right hand ear 35 of the U-shaped anchor plate 26 is apertured for the journalling therein and for the support of the control arm 14. A second stop plate 50 is secured to the control arm 14 by a screw 51 that may if preferred extend through both. The stop plate 50 carries an axially extending registration pin 52 that enters a socket in the right hand anchor plate ear 35 conforming with the connector female fitting on the arc 2 with which the male fitting 5 is making connection. An extension 55 may be added to the control arm 14 by a collar 56 and pins 57 and 58 if required.

Where it is desired that a through circuit be provided for the device or that an impedance be inserted in a circuit of which the device shown in the accompanying drawings is a part, the connector male fitting 5 first is withdrawn illustratively from the connector engaged such as the female fitting 8 shown, by pulling the control arm 14 from outside a cabinet in which the device is maintained. Pulling the control arm 14 draws the cone 40 from beneath the ball 23 and removes support from the right hand end of the connector male fitting carrying arm 15, permitting the spring 24 to elevate the male fitting 5 up out of the female fitting with which it was engaged.

Rotating the control arm 14 through the bevel gears 34 and 36, with the left hand end of the connector male fitting carrying arm 15 so elevated, causes the gear 36 to carry the base 18 and moves the arm 15 to another female fitting of a desired impedance, indicated on the panel of the cabinet on which the device is maintained and by action of the detent ball 20 as it drops into a corresponding detent hole 6' or 7' etc.

Thrusting the control arm 14 away from the operator inserts the cone 40 beneath the ball 23 to support the right hand end and to depress the left hand end of the connector male fitting bearing arm 15 against the yielding resilience of the spring 24. Accuracy of registration is insured by the detent ball 20 and by the pin 52 on the stop plate 50 that must be in registration with one of the apertures in the anchor plate right hand ear 35 for the operation to be accomplished.

It is to be understood that the device and its parts that are shown and described hereby have been submitted for the purposes of illustrating and describing an operative embodiment of the present invention and that modifications and equivalents thereof may be substituted therefor without departing from the scope of the present invention.

What I claim is:

In a switching device of the character described, a base member, a plurality of female switch connectors arranged on said base member concentric to a common axis, a radial support arm rotatably mounted on said base member and adapted to be brought into radial alignment with any selected female switch connector, gearing means for rotating said radial support arm, a lever pivotally mounted on said radial support arm, a male switch plug mounted on the radially outer end of said lever and adapted to be brought into and out of engagement with said female switch connectors by rocking motion of said lever, yielding means normally urging said lever to maintain said male switch connector out of engagement with said female switch connectors, cam means for rocking said lever in opposition to said yielding means to cause engagement of said male connector with a selected female connector, a single operating shaft mounted on said base member for rotational and axial sliding movement, an operative connection between said operating shaft and said gearing means whereby rotation of said operating shaft causes rotary movement of said radial support arm into indexed alignment with any one of said female switch connector and an operative connection between said operating shaft and said cam means whereby axial sliding movement of said operating shaft causes actuation of said cam means to cause in turn a connection between said male switch connector and a selected female switch connector.

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