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BRIDGING CONNECTION BETWEEN A BRANCH
CABLE AND AN UNBROKEN COAXIAL CABLE
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Fig 1

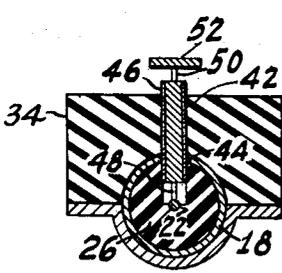
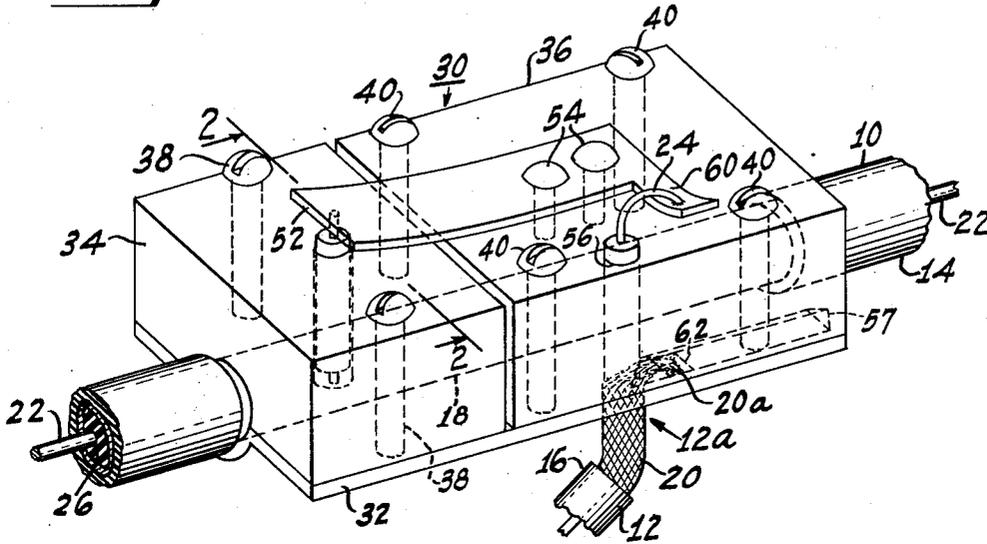


Fig 2

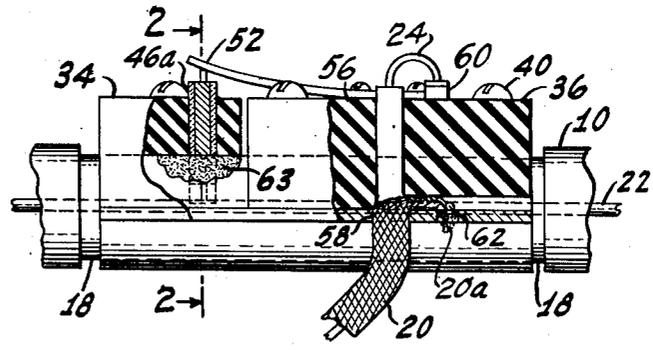


Fig 3

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BRIDGING CONNECTION BETWEEN A BRANCH CABLE AND AN UNBROKEN COAXIAL CABLE

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This invention relates to bridging connections, and more particularly to a bridging connection for a coaxial cable.

One of the problems encountered in making bridging connections to a coaxial cable has been the extensive labor required to make multiple connections. A bridging connection is one in which a branch cable is connected to an unbroken main cable. Bridging connections are often desirable for example, in apartment building television installations where a single coaxial cable from a common antenna and preamplifier has connected to it the input circuits of several television receivers. These connections are often spaced at irregular intervals along the cable depending on the spacing between floors and between receivers. In making these connections, it has been found that a major expense resides in the labor costs. Furthermore, these connections should be reliable and substantially permanent so that minimum servicing is required. Usually, a resistor is serially connected between the inner conductor of the branch line and that of the main line to prevent the withdrawal of excessive energy by any single branch line, and to prevent excessive reflections in the main line. The resistor serves also as an isolating resistor. The practice in the past has been to cut into the main cable at the desired point of connection and make soldered connections to the inner and outer conductors of the coaxial cable to connect to the branch coaxial cable. A resistor is then connected between the main cable and inner conductor connection and the termination of the branch cable line conductor. A considerable amount of costly labor is necessarily involved in the time consuming procedure. Previous attempts to eliminate the necessity of soldered connections have not been completely successful.

It is an object of the present invention to make an easy bridging connection to a coaxial cable.

It is another object of the invention to make such a connection which has a long life.

It is another object of the invention to make a bridging connection with a minimum of hand labor.

A further object of the invention is to make a bridging connection with desirable electrical properties, for example, only a slight electrical discontinuity at the bridging connection point, thereby avoiding excessive reflections therefrom.

A still further object of the invention is to provide a simple, easy method of making a bridging connection.

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These and other objects, advantages, and novel features of the invention will become more apparent from the following description when taken in connection with the accompanying drawing in which like reference numerals refer to like parts and in which:

Fig. 1 is a perspective view of a bridging connection in accordance with the invention;

Fig. 2 is a cross-sectional view along the lines 2-2 of Fig. 1; and

Fig. 3 is a side elevational view partly in cross-section of the connection of Fig. 1.

In accordance with the invention, I provide a clamping unit within which the main coaxial cable to which a bridging connection is to be made may be securely clamped. The outer conductor of the main cable is drilled for insertion of a resistor or other connection which makes contact at one terminal thereof to the inner conductor. The other terminal of the resistor or other connection is connected to the inner conductor of the coaxial cable to which the bridging connection is to be made. Preferably, I secure a long-life connection of the resistor terminals by a spring which exerts pressure on the terminals at their respective connecting points.

Referring now more particularly to the drawing, 10 is a main coaxial cable to which a branch cable 12 is to be connected with a bridging connection. Each of the cables 10, 12 comprises respectively insulating sheaths 14, 16, stranded outer conductors 18, 20, inner conductors 22, 24, and inner dielectric 26 of the cable 10 and that (not shown) of cable 12 which may be polyethylene between the inner and outer conductors.

In order to make the connection between the branch cable 12 and the main coaxial cable 10, there is provided a clamping unit 30. The unit 30 comprises a metallic strap 32, a first block 34, and a second block 36. The blocks 34, 36 are secured to the strap 32 by screws 38 and 40 respectively. Block 34 has a drilled aperture 42 and outer conductor 18 of main cable 10 has a drilled aperture 44 substantially in registry with the first aperture 42. Within these apertures is inserted a standard cylindrical resistor 46 having one terminal thereof in contact with inner conductor 22 of main cable 10. The resistor 46 preferably includes the usual insulating exterior sheath 48a. The first block 34 may thus be of metal if desired. The other terminal 50 of resistor 46 is engaged by a spring 52 which also makes electrical contact therewith. Spring 52 is fixed to the second block 36 by rivets 54 which ensure the

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exertion of spring pressure on the resistor terminals when screws 40 are tightened to exert clamping pressure. The second block 36 may be of dielectric or metal, but if the latter, the spring 52 should be suitably insulated therefrom. A second aperture 58 is drilled in the second block 36 substantially in registry with strap aperture 56. A terminating portion 12a of the auxiliary cable 12 passes through these apertures with the portion passing through the aperture 56 in the second block 36 having the outer conductor 20 stripped. A portion 20a of the stripped outer conductor is laid in an inverted V cut 57 at the bottom of the block 36 and the end thereof may extend downwardly through a second aperture in block 36 as more clearly seen in Fig. 3. The polyethylene dielectric is removed from around the inner conductor 24 at the end of the terminating portion 12a to make connection to a terminal ear 60 on the spring 52.

In making the bridging connection, the following steps may be followed. First the outer sheath 14 of main cable 10 is stripped for a sufficient distance to receive the strap 32. To aid in the later drilling of the braided main cable outer conductor 18, a small portion 63 thereof is now tinned at a point which will be under the aperture 42 with the first block 34 in place. The strap 32 is laid against the exposed outer conductor 18 of main cable 10 and the first block 34 is affixed to the strap 32 by the screws 33. By this means the main cable is clamped between block 34 and strap 32. The aperture in outer conductor 18 and the polyethylene 26 of the main cable 10 is now drilled using the strap 32 and block 34 as a jig. Thus apertures 42 and 44 respectively in first block 34 and in cable outer conductor 18 are aligned and in registry. The drill preferably is brought to within a few thousandths of an inch of the inner conductor 22 of the main cable 10, but preferably is not brought into contact with the inner conductor 22 to avoid damaging it. Furthermore, it is found that a satisfactory connection is made without bringing the drill any closer. The resistor 46 is prepared by clipping the terminals 48 and 50 very closely, say to approximately a sixteenth of an inch each, or less. The resistor 46 is now inserted in the aligned apertures 42, 44 with the terminal 48 substantially centered on the inner conductor 22. Obviously, if it is not desired to use the resistor at this point, any connection, such as a probe, having a terminal like the terminal 46 of sufficient stiffness to be spring loaded could be used.

The sheath 16 is stripped from end portion 12a which is fed through strap aperture 58. The stripped and twisted outer conductor end piece 12a is fed through strap aperture 62 to hold a part of it in place to be under the inverted V cut 57 of the second block 36. The second block 36 may now be put in place with portion 12a fed through the second block aperture 56. As the screws 40 are tightened, the spring exerts pressure on the terminals 50 and 48 of resistor 46. This pressure is sufficient to cause the remaining film of polyethylene to flow aside under the pressure so that contact is made with the inner main cable inner conductor 22. The end piece 12a is aligned with the V cut 57 as the second block 36 is brought into place and compressed therein. The end of inner conductor 24 may be soldered to the ear 60. The end of the twisted piece 12a may be soldered to the outside of strap 32.

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The operation of assembly is relatively simple and requires only about five minutes or less. All of the connections are electrically well made. The outer conductor 20 of the auxiliary cable is pressed tightly against the strap 32 which is in contact under its length with the main cable outer conductor 18. The continuous spring pressure exerted against the terminal 50 maintains good contact and the spring pressure also maintains good contact between the terminal 48 and the main cable inner conductor 22. It has been found that these spring loaded connections will remain electrically good although subjected to accelerated life tests the equivalent of years of service. Prior to the present invention, the initial pressure of a contact against main inner conductor 22, the contacting wire or probe being secured to a cable clamp by a screw or the like, has been relied on for contact. However, it is found that cold flow of the polyethylene and distortion of the main inner conductor 22 causes the initial pressure to relax. A good contact of long life is therefore uncertain. In contradistinction the present arrangement secures a long life contact by the pressure of spring 52. The resistor 46 by its insertion at least partially within the outer conductor 18 makes contact with the main cable inner conductor 22 at the closest possible point. The undesirable stray capacity effect which might exist if the connection to the resistor 46 were made outside the outer conductor 18, as has been done before the invention, is avoided. Therefore, undesired reflections in the main cable 10 are minimized. The invention has thus been described as a clamping arrangement with provisions for a resistor to be inserted within the outer conductor of a main coaxial cable having one terminal held in contact with the main coaxial cable inner conductor by a spring which maintains contact with the other resistor terminal. The spring is also connected to the inner conductor of an auxiliary coaxial cable. The outer conductors are connected together through the clamp. By the insertion of the resistor in such close proximity to the main cable inner conductor, desirable electrical properties are achieved in the bridging connection. Furthermore, this spring loaded bridging connection is easily and simply made and assembled with a saving of time and labor and is of very long life.

It should be understood that the scope of the invention is not limited to the specific application thereof to television or other high frequency transmission lines described heretofore. The invention may be applied to similar bridge connections or to other types of lines having an insulated conductor and a shield or other outer conductor.

What is claimed is:

1. A connector for a main and a branch cable each having an inner and an outer conductor, comprising a metallic strap to receive a portion of said main cable with the outer conductor thereof in contact with said strap, a first block for clamping said main cable between said block and said strap, said first block having an aperture to register with an aperture in the outer conductor of said line portion, a second dielectric block to clamp a portion of said branch cable outer conductor between said second block and said strap and also to clamp said main cable, a contact unit including spring means secured to said second block element to be connected to the inner conductor of said branch cable, and means

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to contact through said apertures said cable portion inner conductor and held in contact by said spring means, thereby to make electrical connection between said inner conductors.

2. A connector for making a bridging connection between a main transmission line portion and the end portion of a branch transmission line, each said line having an inner and an outer conductor, comprising a metallic strap, a bridge unit including dielectric means for clamping between said unit and said strap said line portion with said main line portion outer conductor thereby held in electrical contact with said strap and with a piece of said branch end line portion outer conductor held in electrical contact with said strap, said bridge unit having an aperture through which and through a registering aperture in said first portion outer conductor a resistor is to be inserted to make contact at one terminal with said main portion inner conductor, and spring means cooperating to engage

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the other terminal of said resistor to maintain contact therewith and to maintain contact between said one terminal and said main portion inner conductor.

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