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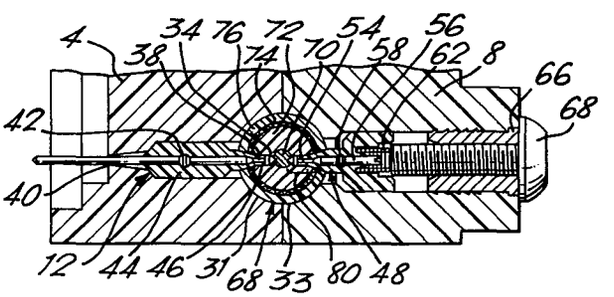
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(54) Coaxial tap-connector.

(57) A coaxial tap-connector comprises a pair of housing parts (4, 8) for receiving a cable (68) between them. A probe (12) in one part (4) penetrates the cable to effect electrical connection to the core (70). A back-up probe (48) in the other housing (8) is spring loaded and arranged to penetrate the cable, subsequently, to support the cable core opposite to the first probe (12). The tip of the probe (12) has a conductive shank (38) with an enlarged diameter frusto-conical head (34). A surrounding core of dielectric abuts the head (34) and is of corresponding diameter. The forward end of the other probe (48) is suitably of similar structure.



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Coaxial Tap-connector

This invention relates to a coaxial tap-connector.

It is general practice when needing to make a tap or T-connection to a coaxial cable to cut the cable and interpose a tap coupling.

In U.S. Patent 4,120,554 there has been proposed a tap-connector in which the core conductor of a coaxial cable is captured between a pair of probes adapted to penetrate the outer sheath and a dielectric of the cable. One of the probes is spring loaded and is arranged to support the core against the tip of the other probe which effects electrical contact.

Difficulties have arisen in use of this connector in ensuring maintenance of electrical separation between the cable shield and core, and it is an object to overcome these difficulties.

A coaxial tap-connector according to the present invention comprises a two part housing defining between the parts a passageway for a coaxial cable one housing part supporting a first probe arranged for penetrating the cable and engaging the core, the other housing part supporting a second probe, opposed to the first, and arranged to penetrate the cable and engage the core, the second probe being spring loaded for support of the cable core against the tip of the first probe, the first probe comprising a conductive core having the tip exposed from a surrounding dielectric case and is characterised in that the first probe comprises a conductive shank portion formed at the tip with an enlarged diameter frustoconical head presenting a rear facing shoulder and a forward point

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for penetrating the cable, the dielectric case surrounding the shank portion and having an outer diameter corresponding to that of the enlarged diameter tip portion.

Suitably the second probe is similarly formed.

The invention will now be described with reference, by way of example, to the accompanying partly diagrammatic drawings, in which:-

Figure 1 is an exploded perspective view of a coaxial tap-connector;

Figure 2 is an assembled view of the connector of Figure 1 with a coaxial cable prior to insertion;

Figure 3 is a fragmentary cross-section of the connector of Figure 2, to an enlarged scale, at an intermediate condition of assembly;

Figure 4 is a view similar to that of Figure 3 at a subsequent stage of assembly;

Figure 5 is a view similar to that of Figure 4;

Figure 6 is a view similar to that of part of Figure 4 but showing the first probe just penetrating the cable; and

Figure 7 is an enlarged fragmentary section illustrating engagement of a shield contact.

The connector of Figures 1 and 2 comprises a housing block 4, a back plate 6, a housing part 8, all of suitable insulating material, and a printed circuit board 10 receivable within a rear cavity of the block 4 and adapted to be retained by back plate 6 and screws 26. A pair of spaced channel form projections 16 extend normally from a face of housing block 4 and are slidably receivable in respective channel guides 28 formed in housing part 8 for guiding the housing part 8 in rectilinear fashion towards the block 4. A clamping screw 30 extends through housing part 8 to engage a threaded bore 20 in block 4 for urging the part 8 towards the block 4.

At the lower side, as seen in Figures 1 and 2 the

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block is formed with an arcuate recess 31 extending from end to end of the block 4, and the part 8 is formed with a complementary recess 33. The recesses 31, 33 together define a passageway 32 for a coaxial cable 68.

A conductor engaging probe 12 is mounted in the block 4 and projects from a centre portion of the recess 31. A pair of braid engaging contacts 14 is disposed in the recess 31, one on each side of the probe 12.

Referring now to Figure 3, the probe 12 comprises a conductive pin 40, projecting at its rear end from the block 4 for connection to the printed circuit board 10 of Figure 1, and extends through a dielectric body 44 mounted in a cavity of block 4 and secured to the pin 40 against axial movement by an annual shoulder 42 formed on the pin. At its forward end, the pin 40 is formed with an enlarged diameter head 34 of frustoconical form and presenting a rear facing shoulder 36, and a short length 38 of the pin extending rearwardly from the shoulder 36 is of reduced diameter. The dielectric body 44 at its forward end 46, abuts the shoulder 36, and for a short length is of outer diameter equal to that of the head 34 before increasing rearwardly in tapering manner.

A support probe 48 is mounted in the housing part 8 in axial alignment with the probe 12 and is movably mounted within a bore by means of a set screw 64 acting through a biasing spring 62 and mounted in a threaded boss 66. The probe 48 comprises a metal pin 56 mounted within a dielectric body slidable within the bore of the housing part 8. The pin 56 has an enlarged diameter head 50, of frustoconical form corresponding in form and size to the tip of probe 12, and presenting a rear facing annular shoulder 52 from which extends a pin portion 54 of reduced diameter. The dielectric body abuts the shoulder 52 and extends rearwardly about the reduced pin portion 54 over a length 60 of diameter equal to that of the head before

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increasing progressively in diameter about a rear portion of the pin 56 which has an annular shoulder 58 to secure the pin to the dielectric against relative axial movement. The dielectric body is formed at its rear with a recess receiving the forward end of spring 62.

The braid contacts 14 as seen in Figure 7, suitably comprise a pair of pointed fingers 82, 84 extending inwardly from a plate portion 83 seated in a shallow V-shaped recess in the block 4. Suitably the plate portions 83 of the two contacts 14 are integrally formed by a rectangular frame having an aperture through which the probe 12 extends and having a rearwardly extending part for connection to the printed circuit board 10 of Figure 1. In an initial condition, not shown, the plate portions 83 are flat and the fingers 82, 84 extend normally therefrom, but in operation the plate portions 14 are driven into the recess to bend the plate portions and urge the points of the fingers 82, 84 together as seen in Figure 7.

In use, the connector is assembled in the condition of Figure 2, and the cable 68, having core conductor 70, dielectric 72, braid shield 74 and outer insulating sheath 76 is positioned between the opposed recesses 31, 33. The tip of probe 12 is positioned substantially centrally of the recess 31, and that of probe 48 projecting slightly inwardly of the surface of recess 33. On tightening of screw 30, the housing part 8 is drawn towards the block 4, and as shown in Figure 5, the tip of probe 48 engages and punctures the cable sheath 76, at one side whilst the tip 34, at the other side, pierces the sheath 76 and the braid shield 74 to penetrate the dielectric 72. Further closure of the block 4 and housing 8 to the figure 4 condition results in the tip 34 of probe 12 engaging the cable core 70 and partially embedding therein.

The screw 64 is now tightened to drive the probe 48 under the bias of spring 62, inwardly from the figure 4

condition, through the braid shield 74 and dielectric 72, to abut the core 70 opposite probe 12 and partially embed in the core in like manner. The reduced uniform diameter lengths of the probes 12 and 48 indicated at 78 in Figure 6 and 80 in Figure 5 extend from the braid 74 to the core 70 of the cable.

It will be appreciated that during the closure process described, the points of the braid contact fingers 84, 82, of Figure 7 will initially engage the cable in spaced apart arrangement, but as force against the cable develops, the points will pierce the sheath 76 and progressively move together as the plate portion 83 is bent into the V-shaped recess, to grip a portion of braid between them, as shown in Figure 7.

Claims:-

1. A coaxial tap-connector comprising a two part housing (4, 8) defining between the parts a passageway (32) for a coaxial cable; one housing part (4) supporting a first probe (12) arranged for penetrating the cable and the other housing part (8) supporting a second probe (48) opposed to the first and arranged to penetrate the cable and engage the core, the second probe (12) being spring loaded (62) for support of the cable core (70) against the tip (34) of the first probe 12, the first probe comprising a conductive core (40) having a tip (34) exposed from surrounding dielectric material (44) characterised in that the first probe (12) comprises a conductive shank portion (38) formed at the tip (34) with an enlarged diameter frustoconical head presenting a rear facing shoulder (36) and a forward point for penetrating the cable, the dielectric core (46) surrounding the shank portion abutting the shoulder (36) and having an outer diameter corresponding to that of the head.

2. A connector as claimed in Claim 1, characterised in that the second probe (48) has a shank portion (54), head (50) and dielectric core (60) which corresponds in structure to that of the first probe (12).

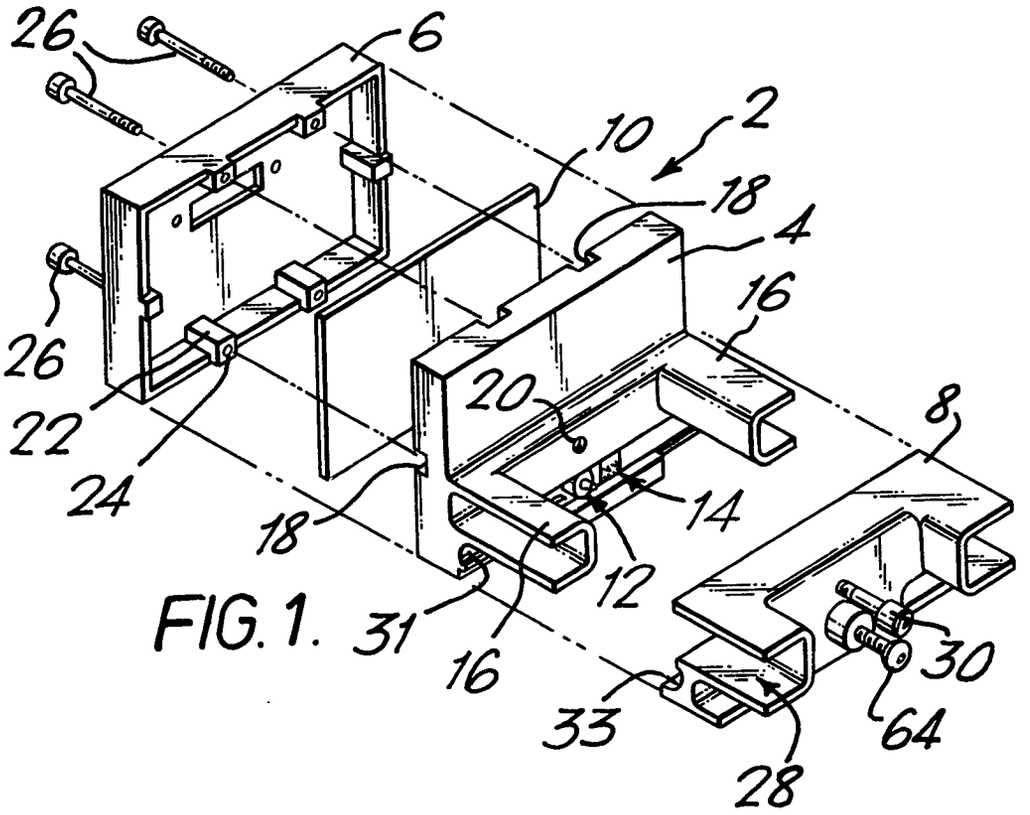

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12
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64
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FIG. 1.

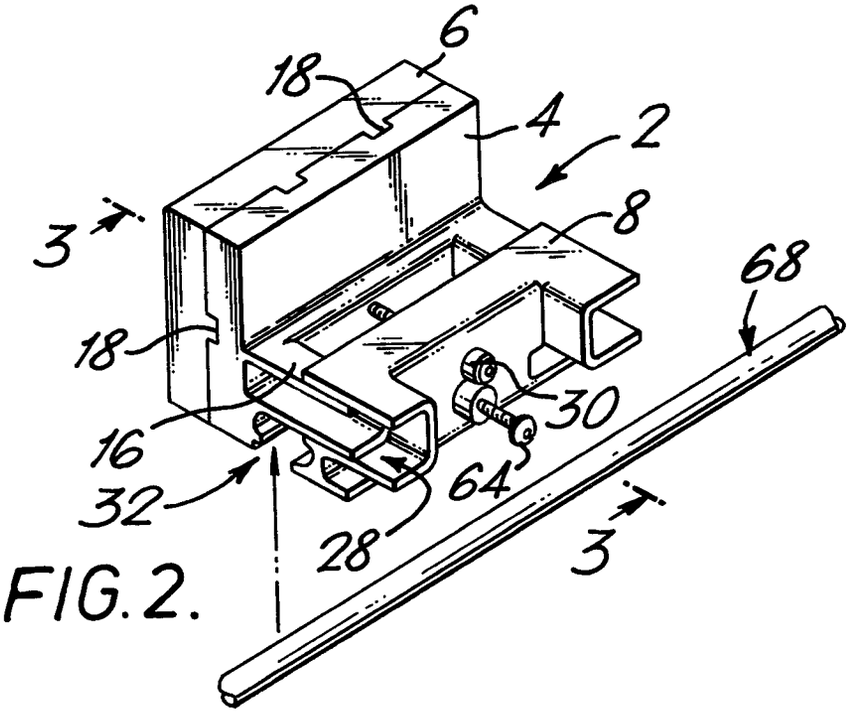
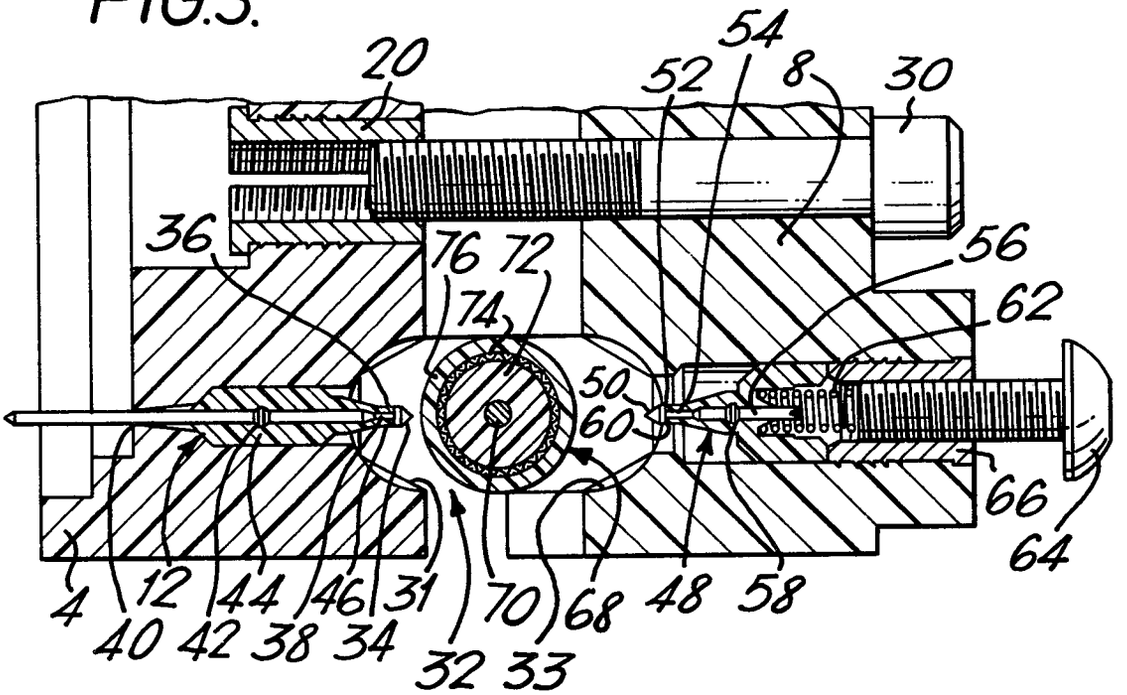

6
18
4
2
3
8
68
18
30
16
32
64
28
3

FIG. 2.

FIG.3.


20
54
52
8
30
36
76
72
74
56
62
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60
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68
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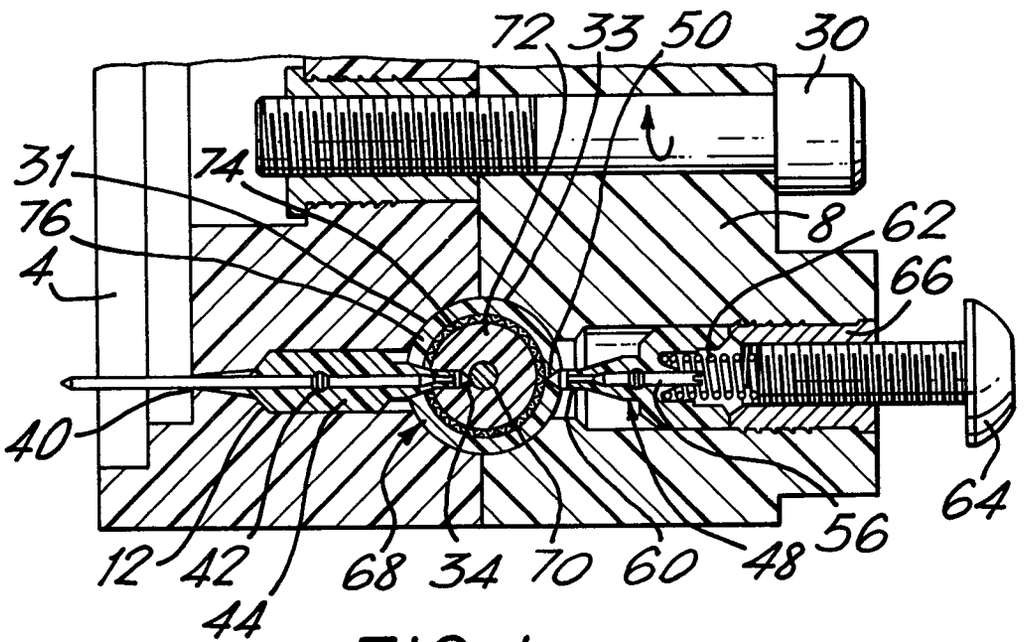

72
33
50
30
31
74
76
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62
4
66
40
64
56
12
42
68
34
70
60
48
44

FIG. 4.

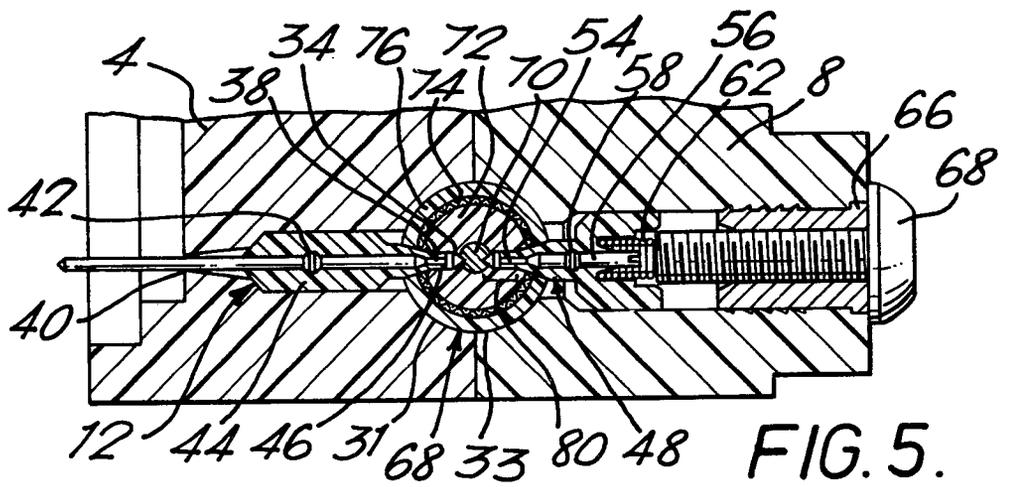


FIG. 5.

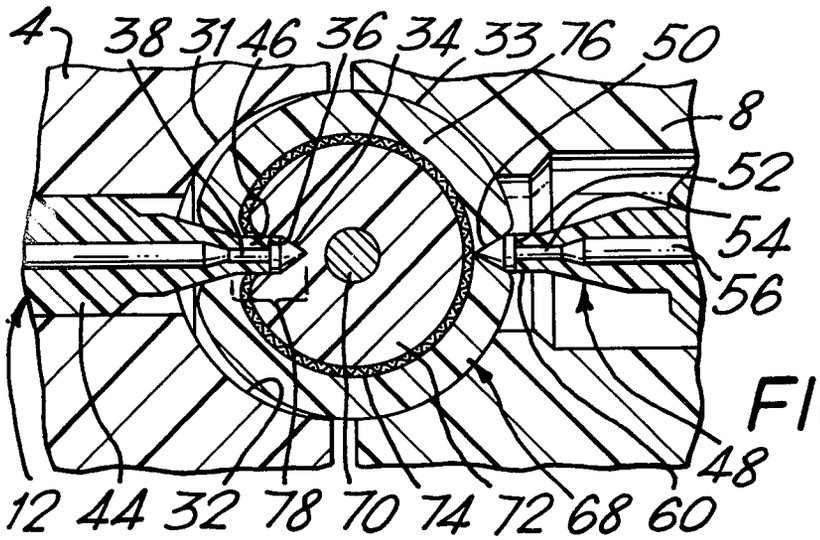


FIG. 6.

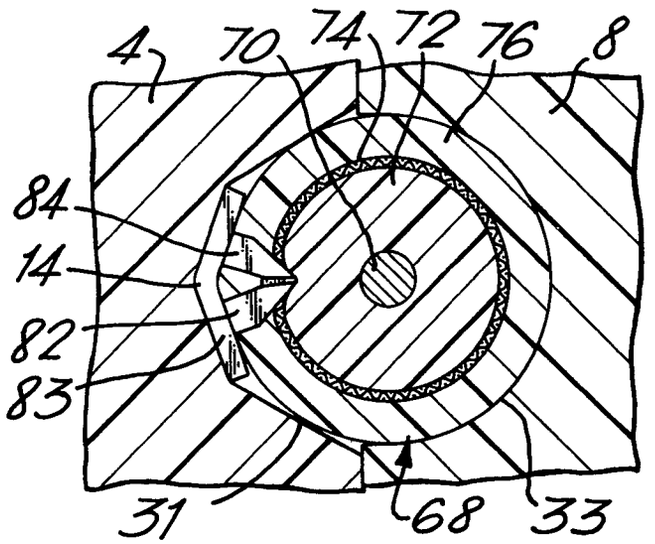


FIG. 7.