

Dec. 22, 1936.

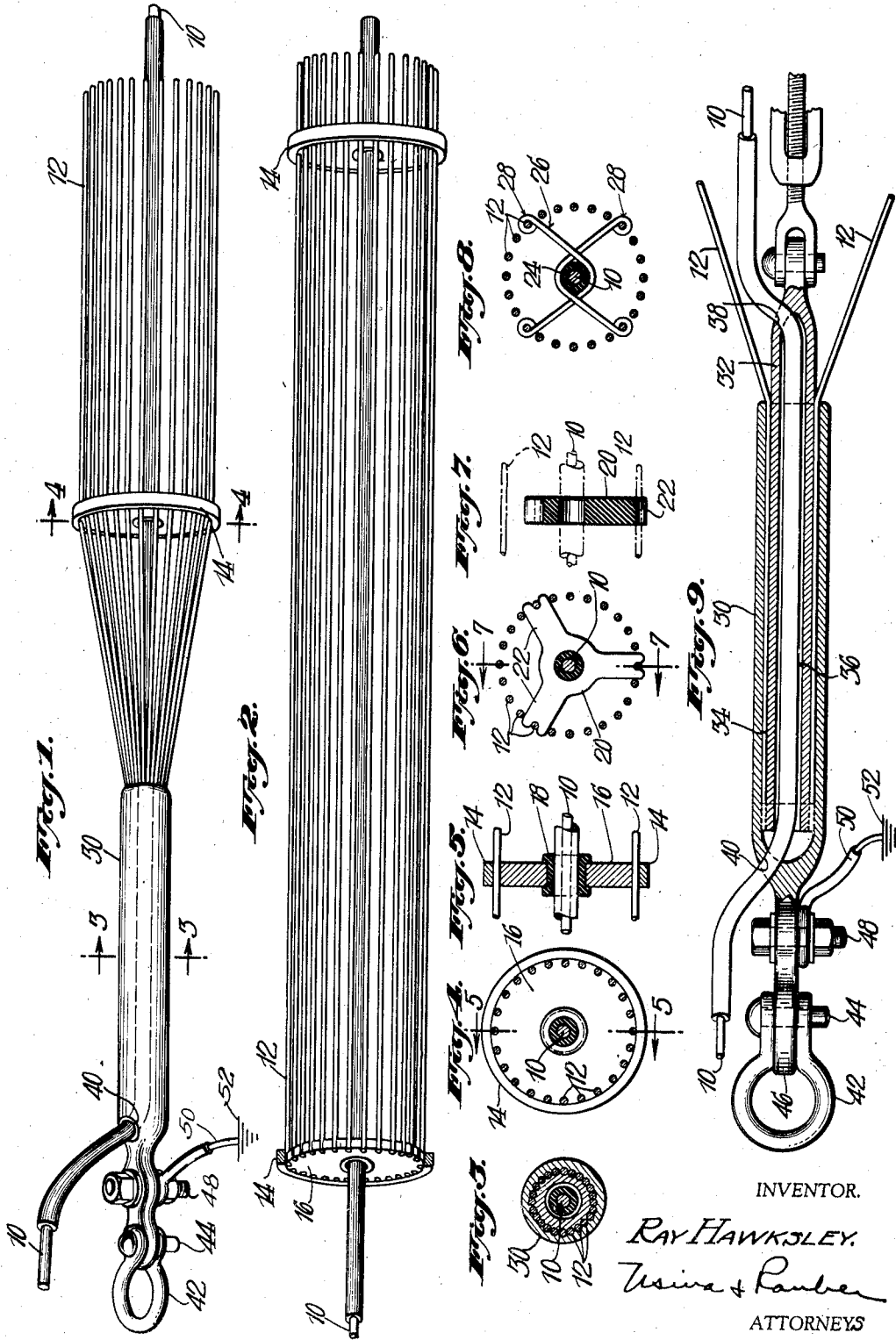
R. HAWKSLEY

2,064,831

SHIELD CONDUCTOR

Filed Dec. 7, 1934

2 Sheets-Sheet 1



Dec. 22, 1936.

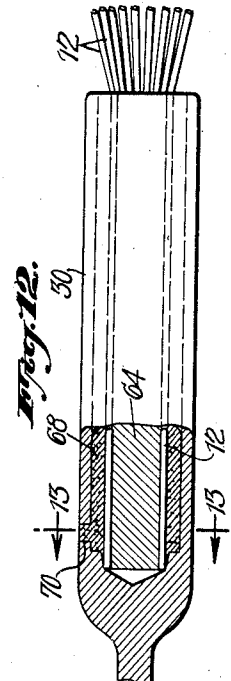
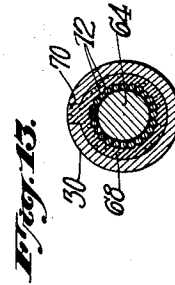
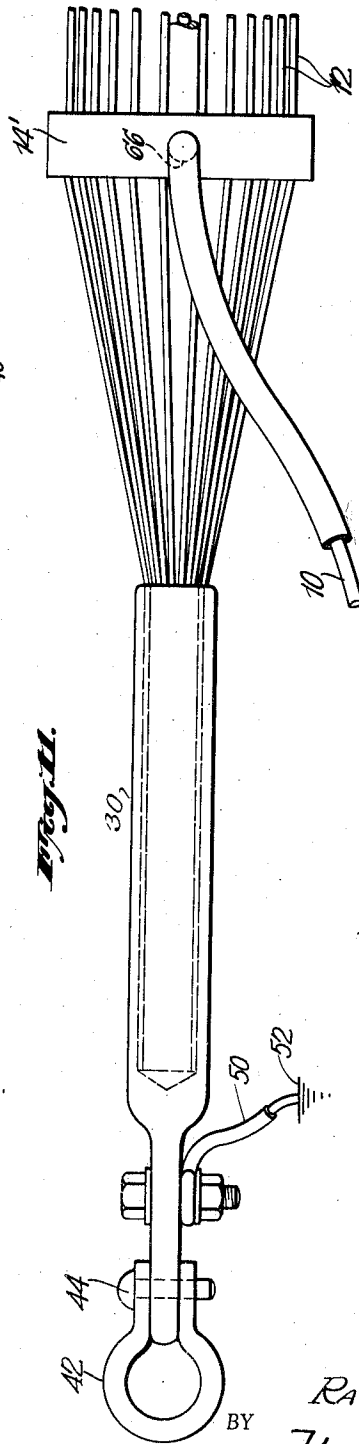
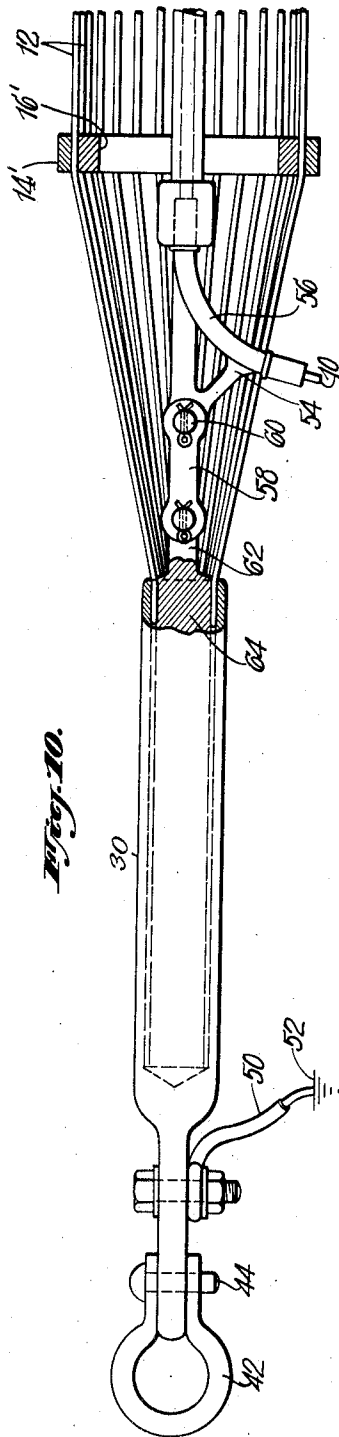
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2 Sheets-Sheet 2



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2,064,831

SHIELD CONDUCTOR

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Application December 7, 1934, Serial No. 756,387

10 Claims. (Cl. 173—81)

In certain copending applications, namely, Serial No. 723,814, filed May 4, 1934 now Patent #2,033,632 dated March 10, 1936; Serial No. 736,342, filed July 21, 1934 and Serial No. 736,453, filed July 23, 1934 now Patent No. 2,033,633 dated March 10, 1936, I have disclosed improvements in hollow antennas and method of making same and also improved hollow conductor construction. The hollow conductors or antennas shown in my prior applications involve the use of telescopically engaged members for circularly spacing a plurality of wires and method of positioning or assembling such wires. The present application is in part a continuation of my former applications and in part an improvement thereon. In the present application, the claims are directed to the combination of a conductor for transmitting high frequency currents, such for example as radio frequency currents and the circularly spaced wires serve as a shield for the conductor which is preferably located centrally of such circularly arranged wires.

A further feature of the invention resides in the structural organization of parts for supporting the radio frequency conductor relatively to the shielding wires and to the means of anchoring or supporting the assemblage. Other more detailed features of the invention will be apparent from the description when read in connection with the accompanying drawings and will be defined with particularity in the appended claims.

In the drawings—

Fig. 1 is a perspective view of one end of a shielded conductor embodying the invention; Fig. 2 is a similar view of the intermediate portion of the conductor; Figs. 3 and 4 are sectional views taken on the correspondingly numbered lines of Fig. 1; Fig. 5 is a section on line 5—5 of Fig. 4; Fig. 6 is a section similar to Fig. 4, but illustrating a modification; Fig. 7 is a section on line 7—7 of Fig. 6; Fig. 8 is a cross section of a modified form of the invention; Fig. 9 is an enlarged longitudinal section illustrating one form of anchorage for the shield and also illustrating means for carrying the high frequency conductor outside of the shielding wires; Fig. 10 is a view similar to Fig. 9, but illustrating a modification in which the high tension wire is carried outwardly by a branch outlet member; Fig. 11 illustrates a further modification in which the high tension conductor is passed laterally outward through telescopic members which space the shield wires; Fig. 12 is a detail view illustrating modified means for securing the shield wires to the anchorage member; Fig. 13 is a section on line 13—13 of Fig. 12.

In the transmission of high voltage or high frequency currents such as used in transmitting currents of radio frequency, it is of utmost importance to shield the radio frequency feeders and leads by means of conductors surrounding such feeders which conductors are to be grounded. As more fully hereinafter described and claimed, the present invention contemplates the provision of a conductor for transmitting currents of radio frequency and a shield therefor including a multiplicity of conducting wires surrounding the conductor and means for maintaining the shielding wires in a predetermined spaced relationship from each other and from the conductor.

Referring in detail to the drawings, 10 represents the conductor which is adapted for transmitting high frequency currents. This conductor 10 is surrounded by a multiplicity of shield wires 12 which are held in spaced relationship by telescopically engaging members 14 and 16. In the embodiment of the invention herein illustrated, the member 16 is of disc-like form and is notched around its periphery to form seats which are so arranged as to maintain the predetermined required spacing between the adjacent conducting wires 12. The central conductor 10, as shown in Figs. 4 and 5, is also maintained in proper spaced relationship with respect to the shield wires by means of an insulating bushing 18 secured in the disc 16. In a modification of Fig. 6, instead of a disc, I employ a spider 20, the legs 22 of which engage a number of equally spaced shield wires 12. In this modification, the remaining shield wires may be assumed to be spaced at other points by a pair of telescopically arranged rings, such for example as shown in my prior applications above mentioned, or as shown in Fig. 10.

In the modification of Fig. 8, the central conductor 10 passes through an insulating sleeve 24, which is positioned centrally of the circularly arranged shield wires 12 by means of spacer wires or clips 26 having portions 28 encircling certain determined shield wires 12.

It is of importance to provide means for passing the high frequency conductor laterally between the circularly arranged shield wires. To these ends, I provide the improved anchorage members best shown in Figs. 1 and 9 to 12 inclusive. The anchorage member of Figs. 1 and 9 includes an outer sleeve-like member 30 and an inner central body 32. The extremities 34 of the shield wires 12 are rigidly secured between

the sleeve 30 and central body 32. In the construction of Figs. 1, 9, 10, and 11, the outer sleeve is subjected to a drawing operation so as to compact the metal thereof about the termini of the wires and thus firmly grip them between the sleeve 30 and the central body 32. The central body 32 is formed with a longitudinal chamber 36 having lateral branch openings 38 and 40, so as to provide means whereby the high frequency conductor 10 can be led outwardly from the space defined by the circularly arranged shield wires 12. As will be apparent from Figs. 1 and 3, the shield wires 12 converge from the spaced apart relationship to a contacting relationship where they are secured to the anchorage fitting. Thus, the central chamber 36 with its branches provides an effective and workman like outlet for the conductor.

The terminal fitting is provided with a clevis 42 connected by a pin 44 passing through a suitable opening in the extremity 46 of the fitting. This fitting carries a binding post 48 for connection to a wire 50 by means of which the shield wires are connected to ground 52. In the modification of Fig. 10, instead of passing the high frequency conductor 10 through a central chamber in the anchorage fitting, I provide a conductor supporting member 54 which has an outlet branch 56 extending laterally between a pair of juxtaposed shield wires. This supporting member is flexibly connected by means of a link 58 and pins 60 with a lug 62 on the end of a solid central body 64. In this Fig. 10, I have shown the shielding wires 12 maintained in spaced relationship by a pair of coating inner and outer rings 16' and 14'.

In the modification of Fig. 11, the high frequency conductor 10 passes laterally outward through an opening 66 formed in a ring 14' which may be regarded as an equivalent of that shown in Fig. 10.

In some cases, instead of securing the inter-engagement of the shielding wires 12 and the anchorage fitting by subjecting the fitting to a drawing or swaging operation, I may secure the parts by the utilization of a filling of readily meltable metal, such as lead, solder or the like. This modification of the invention is illustrated in Figs. 12 and 13, in which the readily meltable metal 68 may be assumed to fill the space between the central body 64 and the sleeve portion 30. This metal may be introduced through a suitable gate or opening 70 in the sleeve-like member 30.

While I have described quite precisely certain specific embodiments of the invention herein illustrated, it is to be understood that various modifications and substitutions of equivalents may be made and it is intended, therefore, that the following claims should be interpreted as broadly as is consistent with the prior art.

What I claim is:—

1. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of wires surrounding the conductor and a pair of coating members between which the wires are clamped in a predetermined spaced relationship, means carried by one of said members for positioning the conductor, and an anchorage fitting comprising nested telescopic members toward which the wires converge and between which they are secured.

2. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of circularly spaced wires surrounding the conductor and means sup-

ported by the wires for positioning the conductor substantially in the center of the circle defined by said spaced wires and anchorage fitting to which the wires are secured.

3. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of circularly spaced wires surrounding the conductor, and means supported by the wires for positioning the conductor substantially in the center of the circle defined by said wires comprising telescopically related members between which wires are clamped, one of said members carrying a bushing through which said conductor passes, and an anchorage fitting comprising nested sleeves toward which the wires converge and between which they are secured.

4. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of wires surrounding the conductor and a pair of nested members of relatively large diameter engaging the wires and maintaining them in a predetermined spaced relationship from each other, means carried by one of said members for positioning the conductor, an anchorage fitting including an outer sleeve and an inner body engaging the ends of the wires, said body having a passage therein through which the conductor extends said sleeve and body being of relatively small diameter as compared with the aforesaid nested members.

5. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of wires surrounding the conductor and means for maintaining the wires in predetermined spaced relationship from each other and from the conductor and an anchorage fitting toward which the wires converge and to which they are secured, said anchorage fitting having therein a longitudinally extending chamber with lateral branch openings through which said conductor passes from the interior to the exterior of the shield formed by said wires.

6. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of circularly spaced wires surrounding the conductor and means for positioning the latter substantially in the center of the circle defined by said spaced wires and an anchorage fitting including a sleeve portion and a central body between which the extremities of said wires are fixedly secured in circular juxtaposition.

7. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of circularly spaced wires surrounding the conductor and means for positioning the latter substantially in the center of the circle defined by said spaced wires and an anchorage fitting including a sleeve portion and a central body between which the extremities of said wires are fixedly secured in circular juxtaposition by a body of readily meltable metal.

8. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of circularly spaced wires surrounding the conductor and means for positioning the latter substantially in the center of the circle defined by said spaced wires and an anchorage fitting including a sleeve portion and a central body between which the extremities of said wires are fixedly secured in circular juxtaposition, said sleeve portion being

forcibly constricted about the extremities of the wires and the central body.

9. In combination with a conductor for transmitting current of radio frequency, a shield therefor comprising a multiplicity of circularly spaced wires surrounding the conductor and means for positioning the latter substantially in the center of the circle defined by said spaced wires and an anchorage fitting including a sleeve portion and a central body between which the extremities of said wires are fixedly secured in circular juxtaposition and supporting means for the conductor secured to said body.

10. In combination with a conductor for trans-

mitting current of radio frequency, a shield therefor comprising a multiplicity of circularly spaced wires surrounding the conductor and means for positioning the latter substantially in the center of the circle defined by said spaced wires and an anchorage fitting including a sleeve portion and a central body between which the extremities of said wires are fixedly secured in circular juxtaposition and an outlet member, having a central part flexibly connected with said central body and branch extending laterally between two adjacent wires and through which said conductor passes.

RAY HAWKSLEY.