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ASYMMETRICAL ANTENNA WITH SHIELDED FEED LINE

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Fig.1.

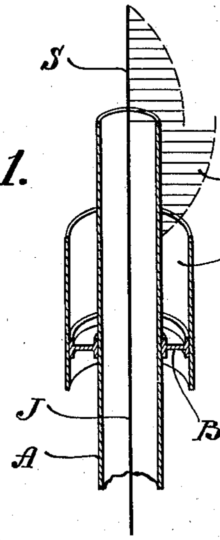


Fig.2.

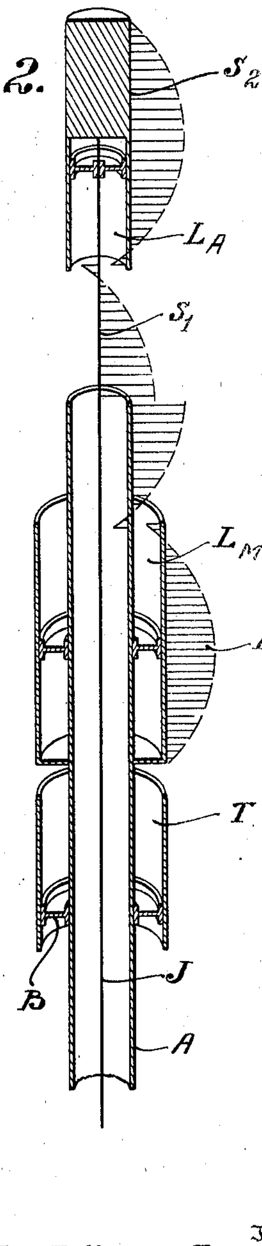
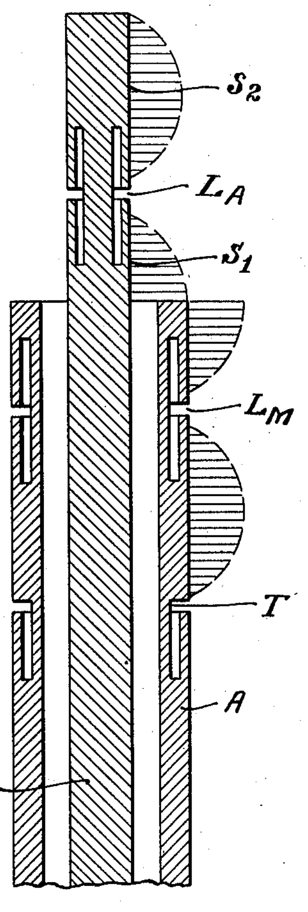


Fig.3.



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ASYMMETRICAL ANTENNA WITH SHIELDED FEED LINE

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5 Claims. (Cl. 250—33)

When feeding asymmetrical antennas such as, for instance, λ/4 transmission radiators or receiving radiators from shielded high frequency cables it is known that on the outside of the cable covering so called cover waves appear causing disturbance especially in the radiation diagram and practically obviating again the useful action of the cable shielding. In order to suppress these covering waves it is known to place at the end of the cable line current resonant structures unilaterally tuned with the cable covering and in the form of parallel rods, for instance, which absorb the current coming from the interior of the cable so that this current is prevented from passing along the cable covering. In order to balance asymmetrical cable lines so-called blocking cups also have become known which comprise essentially a tubular conductor connected unilaterally to the cable covering. On the open end of said conductor there appears a very high resistance (resonance resistance). In accordance with the present invention, such a blocking cup can serve for the suppression of the cable covering waves in that there is situated below the end of the cable covering, at a distance of a quarter wave or an odd multiple thereof, the open end of a quarter wave cup connected at one side of the cable covering and so arranged that the line covering oscillates freely as a radiator. In this way the current passing out of the interior of the cable on the inside of the outer covering is next absorbed by the outside of the covering and usefully employed for a defined radiation while being prevented from further propagation along the cable covering.

The general idea of the present invention is illustrated in Figure 1, while Figures 2 and 3 illustrate modifications thereof. In Figure 1 a coaxial line comprising an inner conductor J and an outer conductor A serves for feeding a λ/4 radiator S. Below the end of the cable covering and at a distance of λ/4 there is arranged a blocking cup T with a sliding bottom B by means of which the covering waves below the open end of the cup will be completely suppressed in practice. The part of the covering situated above this open end, however, oscillates freely and completes the λ/4 radiator 6 as can be seen from the dotted line indicated current distribution I so that said radiator forms a λ/2 dipole.

According to a further extension of the idea of the invention the antenna may consist also of a dipole line in which the currents of undesirable phase are absorbed and rendered ineffective by by-pass lines of known type. In order to render the feeding symmetrical, the radiating part of the outer covering must also be built as a dipole line. This is shown in Figure 2 in which the actual antenna comprises two parts S_1 and S_2 whose current distribution is indicated by line I. A by-pass line is represented by the cup-shaped structure L_A. In the case of the current distribution shown in the drawing the organ L_A is to form an inductive resistance. Exactly the same arrangement is placed also at the outer covering, whereby again a by-pass line L_M is employed. The actual blocking cup for suppressing the covering waves is arranged below the radiating part and is designated by T.

Figure 3 shows a mode of construction of the arrangement illustrated by the Figure 2. The by-pass lines, as well as the blocking cup, are hereby in the form of recesses in the antenna conductor and in the outer covering and symmetrical to the axis so that smooth exterior surfaces are obtained.

Instead of using a blocking cup, also one or several λ/2 parallel rods may, for instance, be employed.

We claim:

1. In association with a concentric cable line having an inner conductor and an outer casing conductor, an antenna including a pair of coaxial quarter wave radiators, one of said radiators being constituted by the end portion of said outer casing and the other by an extension of said inner conductor beyond the said outer casing and means for preventing the flow of high frequency energy along the outside of said casing including an auxiliary shell surrounding said outer casing and having an end adjacent said antenna and a connection between said auxiliary shell and said casing, said connection being spaced from the end of said shell a distance equal to a quarter of the length of the operating wave.

2. In association with a concentric cable line having an inner conductor and an outer casing conductor, an antenna including a pair of coaxial quarter wave radiators, one of said radiators being constituted by the end portion of said outer casing and the other by an extension of said inner conductor beyond said outer casing, said antenna also including coaxial half wave radiators at opposite ends of said pair of quarter wave radiators, each of said half wave radiators comprising a shell conductor connected internally at substantially its midpoint to opposite ends of said pair of quarter wave radiators and means for pre-

venting the flow of high frequency energy along the outside of said casing including an auxiliary shell surrounding said casing and having an end adjacent said antenna and a connection between said auxiliary shell and said casing, said connection being spaced from the end of said shell a distance equal to a quarter of the length of the operating wave.

3. In association with a concentric cable line having an inner conductor and an outer casing conductor, an antenna including a pair of coaxial quarter wave radiators, one of said radiators being constituted by the end portion of said outer casing and the other by an extension of said inner conductor beyond said outer casing, said antenna also including coaxial half wave radiators at opposite ends of said pair of quarter wave radiators, each of said half wave radiators comprising a shell conductor connected internally at substantially its midpoint to opposite ends of said pair of quarter wave radiators.

4. In association with a concentric cable line having an inner conductor and an outer casing conductor, an antenna including a pair of coaxial quarter wave radiators, one of said radiators being constituted by the end portion of said outer casing and the other by an extension of said inner conductor beyond said outer casing, said antenna also including coaxial half wave radiators at opposite ends of said pair of quarter wave radiators, each of said half wave radiators comprising a shell conductor connected internally at substantially its midpoint to opposite ends of said pair of quarter wave radiators, the length of said internal connections being variable.

5. In association with a concentric cable line having an inner conductor and an outer casing conductor, an antenna including a pair of coaxial quarter wave radiators, one of said radiators being constituted by the end portion of said outer casing and the other by an extension of said inner conductor beyond said outer casing, said antenna also including coaxial half wave radiators at opposite ends of said pair of quarter wave radiators, each of said half wave radiators comprising a shell conductor connected internally at substantially its midpoint to opposite ends of said pair of quarter wave radiators, each of said half wave radiators having a diameter substantially the same as that of the adjacent quarter wave radiator portions.

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