

Nov. 21, 1939.

N. M. RUST

2,180,722

LEAD-IN ARRANGEMENT

Filed May 4, 1936

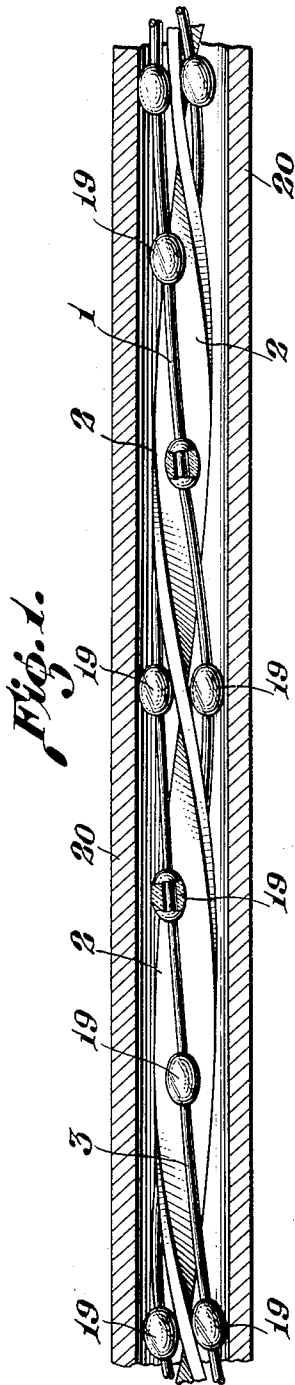


Fig. 3.

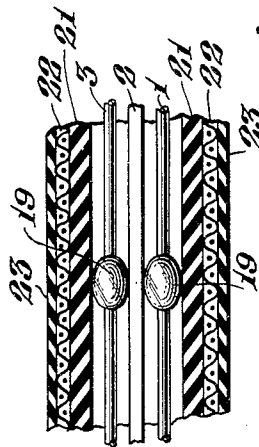
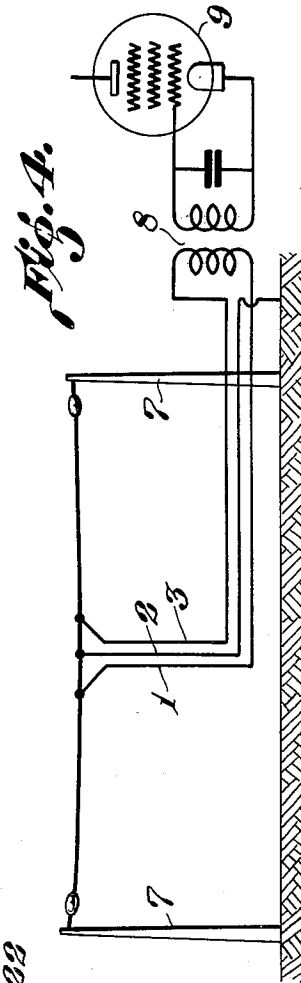


Fig. 2.



Inventor:
N. M. Rust,
by H. S. Green
Attorney

UNITED STATES PATENT OFFICE

2,180,722

LEAD-IN ARRANGEMENT

Noël Meyer Rust, Chelmsford, England, assignor
to Radio Corporation of America, a corpora-
tion of Delaware

Application May 4, 1936, Serial No. 77,726
In Great Britain June 8, 1935

2 Claims. (Cl. 174-27)

This invention relates to lead-in arrangements for wireles receiving systems.

An important object of the invention is to provide a cheap low loss lead-in arrangement suitable for use for short wave or for medium or long wave broadcast reception, and wherein the construction is reasonably flexible mechanically and is such that the lead-in is of low impedance so that it may be directly connected to an associated aerial or aeriels without any need for an interposed transformer at the aerial end.

Another important object of the invention is to provide an improved lead-in arrangement adapted for use selectively with a plurality of aeriels each designed to present optimum efficiency over one of a plurality of wave length ranges.

The invention provides improved lead-in arrangements of the kind wherein three conductors are used.

According to this invention a lead-in arrangement comprises three conductors which are insulated from one another and are arranged to form a flexible or quasi flexible structure and either the outer pair of conductors are utilized for energy transference and the inner conductor earthed or the inner conductor is utilized for energy transference and the outer conductors earthed, the whole arrangement being such that the lead-in system as a whole is of low impedance whereby it may be directly connected to an associated aerial or aeriels without any need for an interposed impedance transformer arrangement at the aerial end.

The invention is illustrated in the accompanying schematic and diagrammatic drawing in which:

Fig. 1 illustrates a section through a preferred form of a three conductor transmission line embodying the invention;

Fig. 2 illustrates diagrammatically a section through a transmission line provided with a preferred type of covering;

Fig. 3 illustrates an arrangement for holding in position the spacing beads along a conductor; and,

Fig. 4 illustrates in diagrammatic form one method of utilizing the transmission line in conjunction with an antenna and a radio receiver.

Referring to Fig. 1 the lead-in comprises three copper or similar strips 1, 2, 3 of which central conductor 2 is constituted by a strip which is given a slight twist and the two outer conductors 1, 3, by wires which follow the twist of the strip. Small bead insulators 19 are threaded upon the wires 1, 3, so that they come on either side of

the strip and in this way relative insulation between the three conductors and correct relative positioning of the three conductors is obtained, while at the same time maintaining flexibility. This three conductor system is run in an outer tube 20, e. g., a lead tube, or (preferably) as shown in Figure 2 a rubber tube 21 having an outer screen 22 of copper braid and a weather proof covering 23. The beads may be held longitudinally in position upon the wire by slightly burring the wire on either side of each bead as shown in Figure 3. The outside copper braid is in use earthed. Where this lead-in arrangement is used as a symmetrical two wire feeder the central strip 2 is earthed. Since by careful design the outer wire conductors may be made both physically and electrostatically nearer the inner strip than the copper braiding the majority of the lines of force between the wire conductors and earth will join between the wire conductors and the strip rather than between the wire conductors and the braiding, and the majority will therefor cut only the relatively low loss bead insulators rather than the relatively high loss rubber outer tubing, so that di-electric losses will be kept low. Where the lead-in arrangement is used as a single wire feeder, the central strip is used for energy transference and the outer wire conductors are earthed so that said wire conductors shield the central strip.

The lead-in arrangements described may be used as shown in Fig. 4 where the central strip conductor 2 is grounded at the receiver and connected at its other end to the middle of a symmetrical dipole in the event that the arrangement is used for short wave reception. The dipole may be mounted by means of poles 7, 7 or the like. At the aerial end of the lead-in arrangement the two outer strip conductors 1 and 3 are connected to the dipole symmetrically about the point of connection of the central grounded conductor 2. The outer conductors are led away from a central conductor in tapered or, what might be referred to as, triangular fashion near the points of connection with the aerial. At the receiver end of the transmission line the outer conductors are connected to opposite ends of the primary of an input transformer 8 whose secondary winding is connected between the grid and cathode of a suitable input tube 9 of the receiver. The tube 9 may be a frequency changer in the case of superheterodyne receiver.

The invention is of wide application but the principal application is for aerial lead-in arrangements for "all wave" ordinary broadcast recep-

tion. Another important application of the invention is, however, to television reception.

5 The lead-in arrangements hereinbefore described are very suitable for use as feeders for they are symmetrical, are of low impedance, and can be suspended easily and cheaply or run quite close to the ground without need for elaborate insulation precautions. The said arrangements may, therefore, be used with advantage as feeders in commercial electrical signalling systems.

10 Having now particularly described and ascertained the nature of the invention and in what manner the same is to be performed, I declare that what I claim is:

15 1. In a lead-in arrangement, a central conductor comprising a flat strip of conducting material which is given a slight twist from end to end,

two outer conductors comprising wires positioned so as to follow the twist of said strip but on opposite sides thereof, a sheath for enclosing said three conductors and bead insulator members threaded upon said wires at spaced apart points thereof so as to come on either side of said strip, said bead insulators being shaped so as to provide insulation between the three conductors and proper spacing between the conductors and the sheath while maintaining flexibility of the lead-in.

2. A lead-in arrangement as described in the next preceding claim characterized by that the bead insulators are held in position on the wires by burring provided on the wires on either side of each bead.

NOËL MEYER RUST.