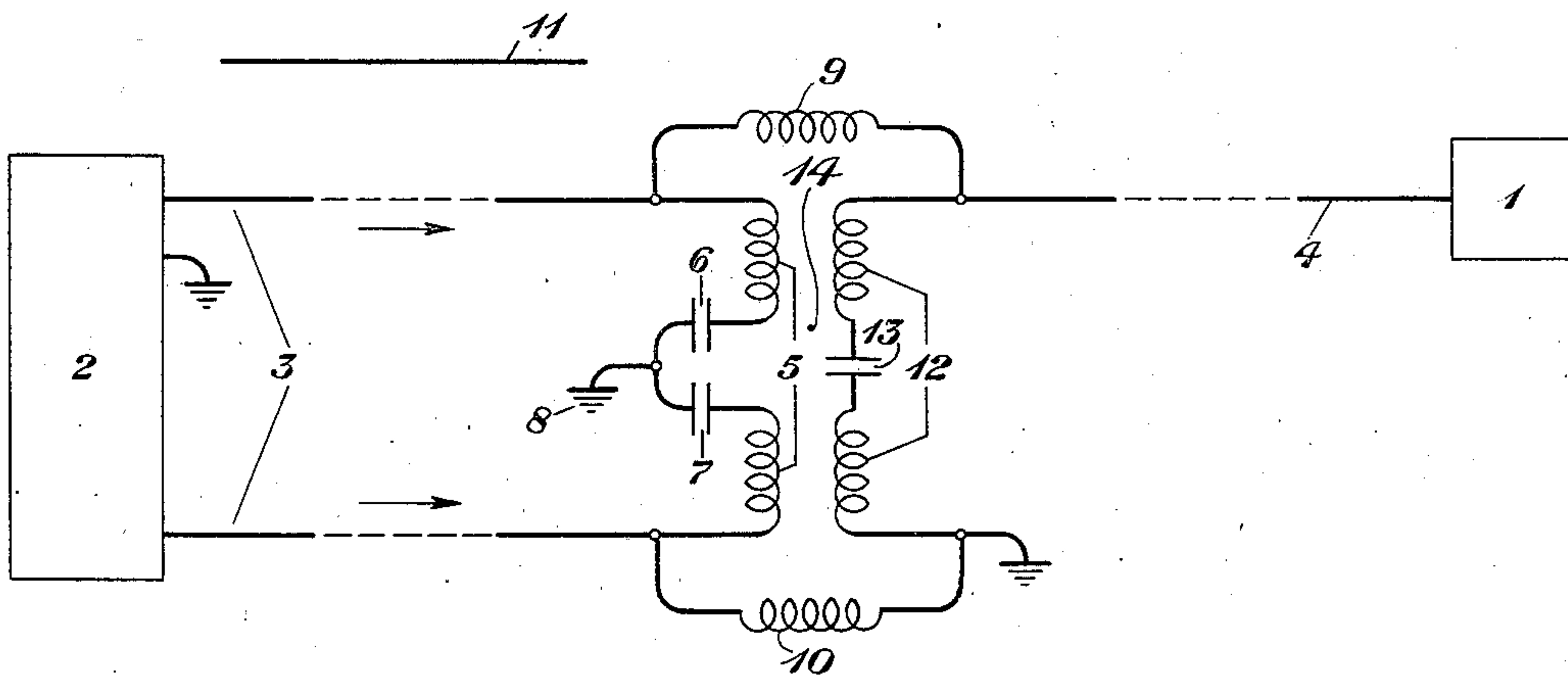


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I. M. ELLESTAD
TRANSMISSION SYSTEM

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TRANSMISSION SYSTEM

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1 Claim. (Cl. 178—44)

This invention relates to transmission systems and more particularly to a means for coupling together two or more sections of a transmission line wherein one of said sections is exposed to interference from neighboring power or communication lines.

In telephone systems it is sometimes necessary to connect a metallic section of line with a grounded section of line. Sometimes the metallic section of the line will be located in the vicinity of a power line or other circuit and hence will be exposed to inductive interference from the power line or other circuit. The power line or other circuit may induce in the metallic section of the telephone line so-called longitudinal currents. These longitudinal currents, if transmitted from the metallic section of the line to the grounded section, would cause undesired interference with the proper functioning of the circuit. It is one of the objects of the invention to provide a means for coupling a metallic section of line, which is exposed to induction, to a grounded section of line in such a manner that induced longitudinal currents will not interfere with the proper functioning of the system, while at the same time allowing the normal transmission of voice currents and signal currents, including direct currents. Other objects and features of the invention will appear more fully from the detailed description thereof hereinafter given.

The invention may be more fully understood from the following description together with the accompanying drawing in which is shown a circuit diagram embodying a preferred form of the invention.

In the drawing is shown a transmission line interconnecting a subscriber's station 1 with a central office 2. This line may be composed of two sections, a metallic section 3 and a grounded section 4. The metallic section and grounded section are connected together in the following manner. A split-winding repeat coil 14 is provided having its windings 5 connected to the tip and ring conductors of metallic section 3 and also having its windings connected to ground 8 through condensers 6 and 7. The windings 12 of the repeat coil 14 are interconnected by condenser 13. The upper winding is connected to the line of grounded section 4 and the lower winding connected to ground. An impedance 9, which may be a repeat coil, is provided connected to the ring conductor of section 3 and the line of section 4. A similar impedance coil 10 is connected to the tip conductor of section

3 and the grounded portion of section 4. As heretofore pointed out the arrangements of the invention are particularly desirable for interconnecting a grounded section of line with a metallic section of line when the metallic section is exposed to inductive interference from a neighboring power line. Hence a portion of a power line 11 is shown in the vicinity of the metallic section 3 of the line.

The invention may be more fully understood from the following description of its operation. The currents which are to be transmitted between the subscriber's station 1 and the central office 2 include not only the voice currents but also alternating current for signaling and direct current for dialing purposes. The location of the metallic section 3 in the vicinity of the power line 11 will cause so-called longitudinal currents to flow over the tip and ring conductors of the metallic section 3 as indicated by the arrows. These longitudinal currents might interfere with voice transmission and signaling or dialing on the line if connection were made in the usual manner between the metallic and grounded sections. Accordingly the windings 5 of the split-winding repeat coil 14 and condensers 6 and 7 have their constants so chosen that they constitute a low impedance shunt to ground for the longitudinal currents induced in the metallic section 3 due to its exposure to the neighboring power line 11. The impedances 9 and 10 are so designed that they will have a high impedance to longitudinal currents and voice currents and a low impedance to direct current. Accordingly the longitudinal currents will neutralize each other in the windings 5 of repeat coil 14 and will not be repeated through coil 12 to the subscriber's station 1. They will not be transmitted through impedance 9 to station 1. Direct current signals will be transmitted between the station 1 and the central office 2 through impedance 9. The voice currents will be transmitted in the normal manner through the transformer comprising repeat coils 5 and 12.

While the invention has been disclosed as embodied in certain specific arrangements which are deemed desirable, it is understood that it is capable of embodiment in many and other widely varied forms without departing from the spirit of the invention as defined by the appended claim.

What is claimed is:

A transmission line comprising a grounded section and a metallic section, a split winding repeating coil having two pairs of windings,

the first pair of said windings having their outer ends connected to the tip and ring conductors of said metallic section and having their inner ends connected together through a circuit including two condensers and a ground connection between the condensers, the second pair of windings of the same repeating coil being connected to said grounded section, the four repeating coil windings constituting a transformer adapted to readily facilitate the transmission of voice currents from one section to

another, the first mentioned repeating coil windings and the circuit interconnecting them being adapted to constitute a low impedance shunt to ground for longitudinal currents induced in said metallic section, and an impedance coil connecting a conductor of said grounded section to a conductor of said metallic section, said last mentioned impedance coil having high impedance to longitudinal and voice currents and a low impedance to direct currents.

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