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RADIO TELEPHONE SYSTEM

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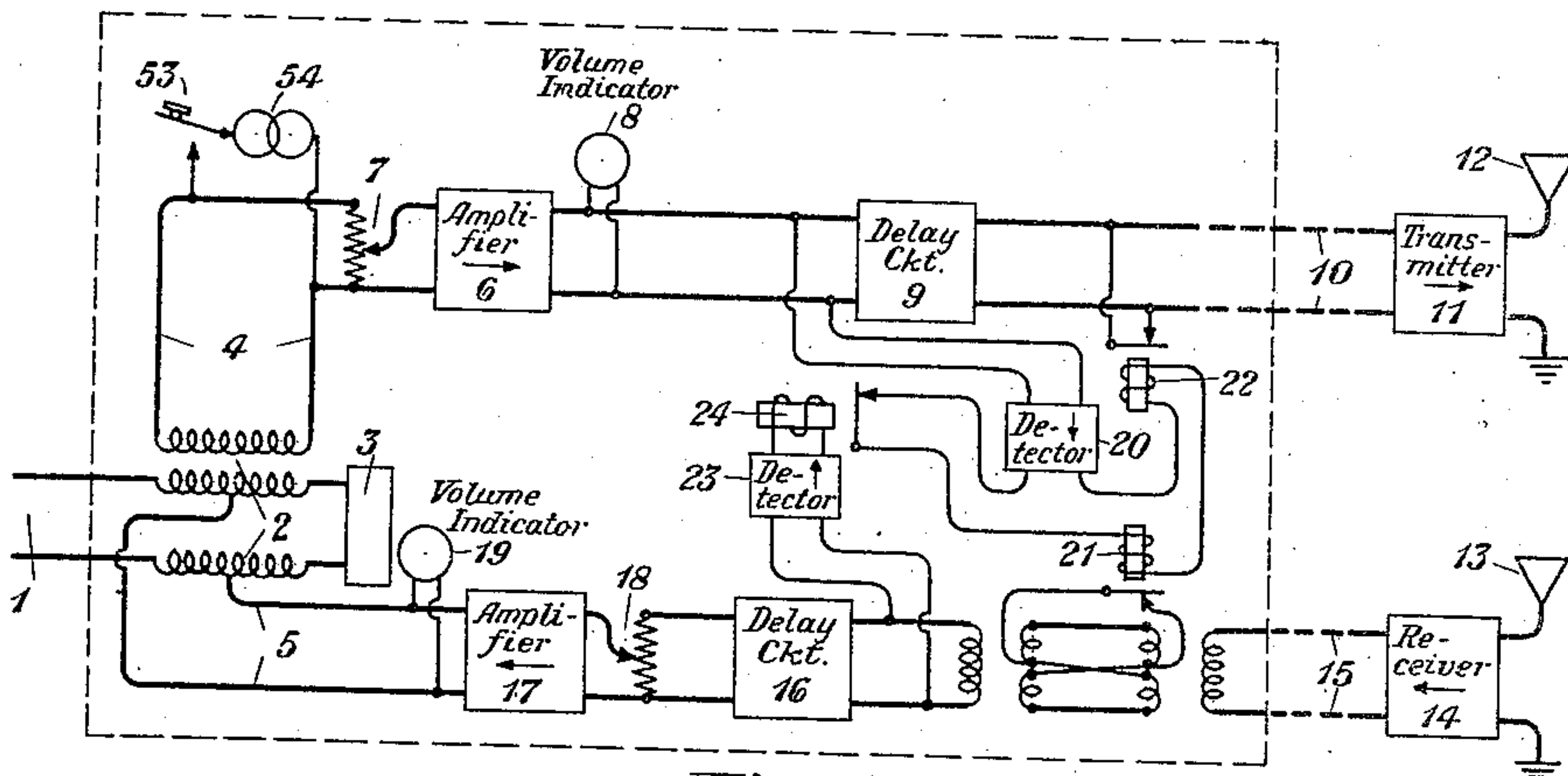


Fig. 1

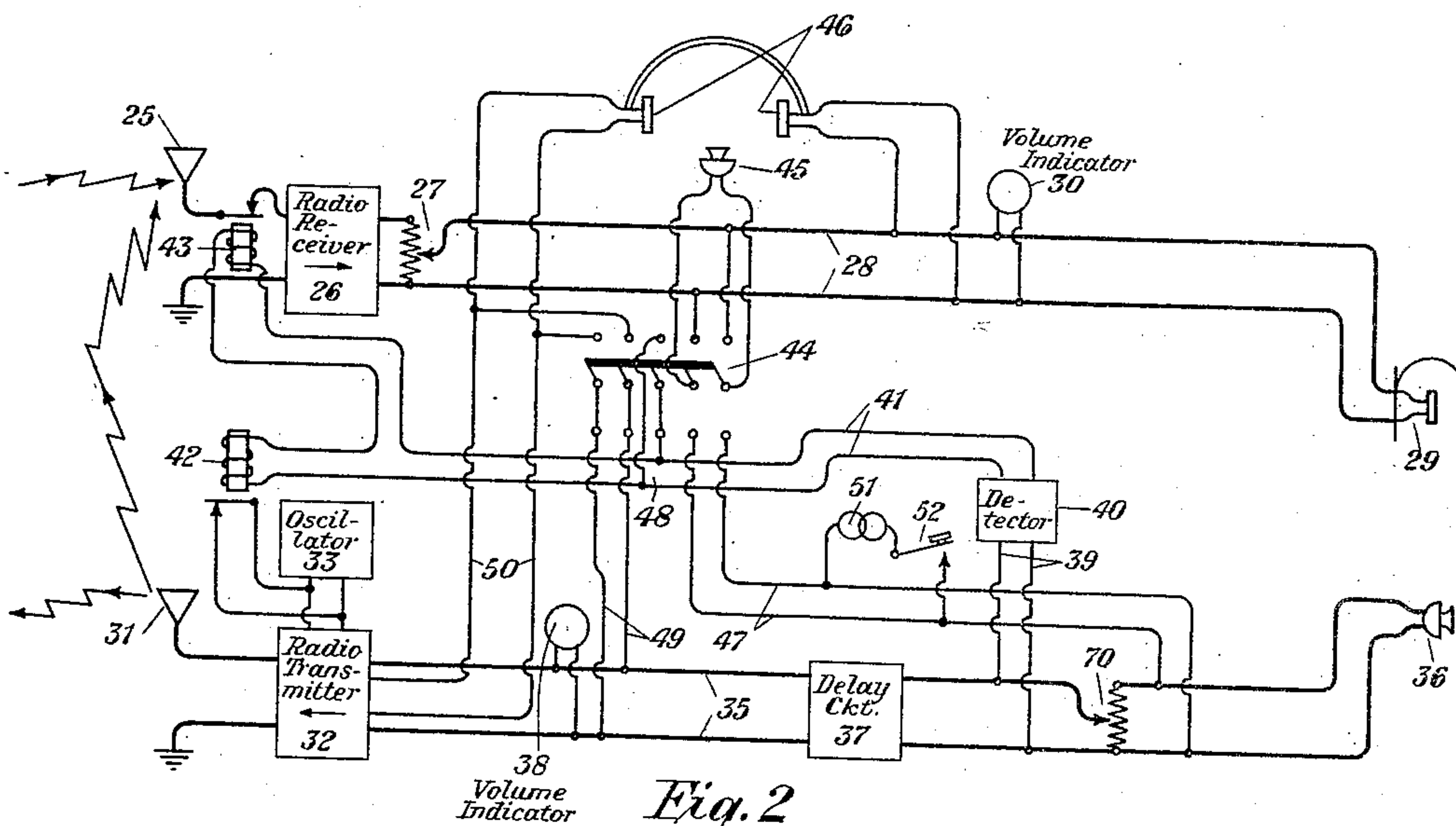


Fig. 2

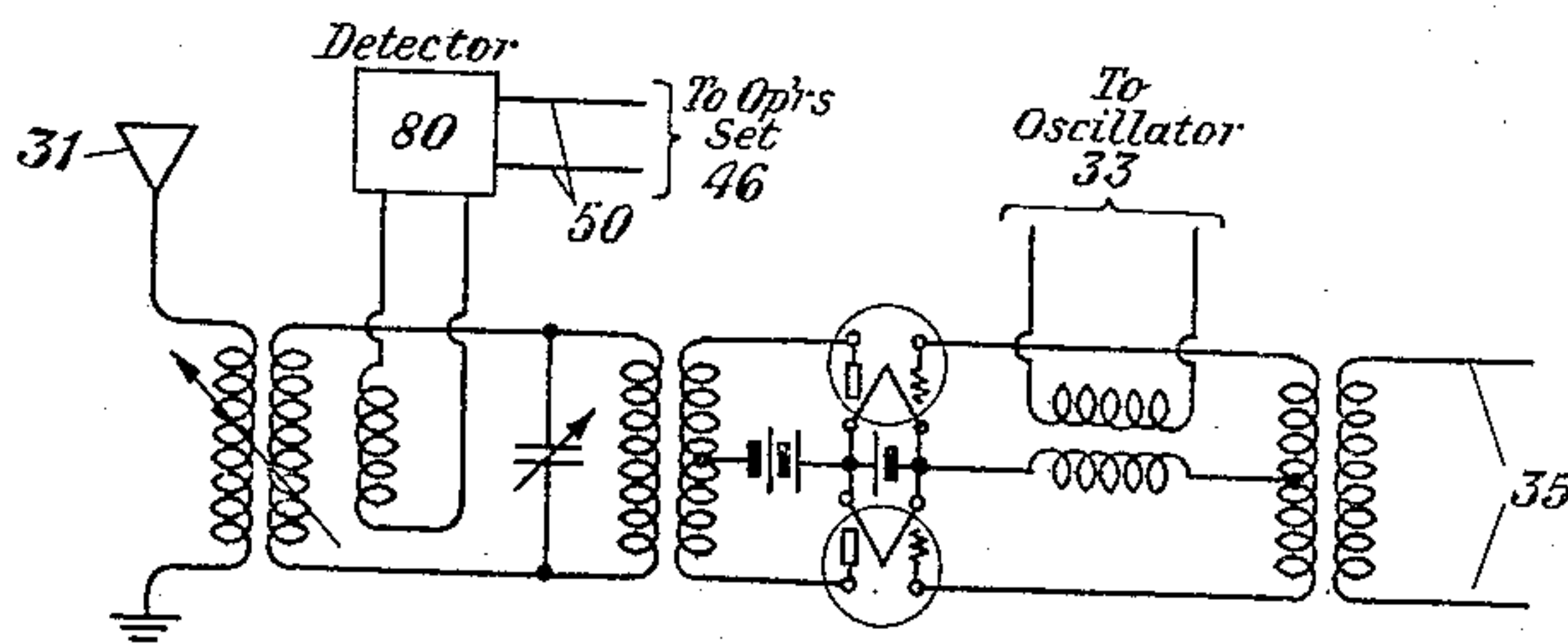


Fig. 3

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RADIO TELEPHONE SYSTEM

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This invention relates to radio communication systems and more particularly to improvements in systems of the type which are suitable for the establishment of telephone communication between a ship and shore.

In the ship to shore radio system of this invention, two separate frequency bands may be utilized for transmission in opposite directions and separate transmitting and receiving circuits may be provided at the shore station and at the station on the ship. In the operation of such a system, the noise from the carrier generating apparatus on the ship might have a tendency to cause interference with the speech signals received on the ship, and radio "spillover," or the speech signals transmitted from the ship, might cause echo effects in the apparatus on the ship. One of the primary objects of the invention consists in the provision of arrangements for preventing the occurrence of interference of the above types in the apparatus on the ship. A further object of the invention consists in the provision of an improved means for monitoring on the ship's apparatus and for the establishment of communication between the ship's operator and the subscriber on the ship and between the ship's operator and the distant operator. A further object of the invention consists in the provision of voice-operated anti-singing apparatus at the shore station to afford the privacy feature of preventing retransmission of speech originating on the ship by the shore transmitter. Further 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 the Figures 1, 2 and 3 of which the invention is illustrated. Fig. 1 is a circuit diagram of the sending and receiving apparatus located on the shore. Fig. 2 is a circuit diagram of the sending and receiving apparatus located on the ship. Fig. 3 shows in more detail, a portion of the arrangements of Fig. 2. Similar reference characters have been

utilized to denote like parts in all of the figures.

In Fig. 1 is shown a telephone line 1 terminating in a hybrid coil 2 and a balancing network 3. Associated with the hybrid coil would be a transmitter circuit 4 and a receiver circuit 5. The transmitter circuit 4 would include an amplifier 6, in the input circuit of which would be a potentiometer 7 for adjusting volume. Bridged across the output of amplifier 6 might be a volume indicating device 8. The amplifier 6 would be connected through a delay circuit 9 to a circuit 10 which extends to the distant radio transmitter apparatus 11 and the antenna 12. A receiving antenna 13 would be provided, connected to radio receiving apparatus 14. This apparatus would be connected by a circuit 15 to the receiver circuit 5, which receiver circuit might include a delay circuit 16 and an amplifier 17. At the input of this amplifier there might be provided a potentiometer 18 for volume adjusting purposes. A volume indicator 19 might be connected across the output of the amplifier. The voice currents transmitted over circuit 4 would be transmitted through a detector device 20 and over a circuit including the voice frequency operated relays 21 and 22 and would operate these relays. The operation of relay 22 opens a normally closed short circuit across the transmitter circuit 4 and allows the voice currents to be transmitted to the antenna 12. The delay circuit 9 is provided so that relay 22 may operate before the voice currents reach that point in the circuit where the normally closed short circuit is located. The operation of relay 21 will open the receiver circuit. Accordingly, while transmission is taking place, the receiving apparatus will be disabled. The incoming signaling currents will be transmitted over circuit 15 and thence through the detector apparatus 23 and over a circuit including the voice operated relay 24 and will operate said relay. The operation of said relay will open the previously mentioned circuit including the relays 21 and 22 and will thus maintain the transmitting circuit 4 in a disabled condition during the reception of signals. Telegraph signaling

apparatus such as the generator 54 and key 53 may be bridged across circuit 4.

The apparatus located on the ship will comprise a receiving antenna 25 which will be connected to the radio receiving apparatus 26. In the output of this apparatus will be included potentiometer 27 for adjusting volume. The output circuit 28 of the radio receiver may also have a volume indicator 30 connected thereto and will be connected to the receiver 29. A transmitting antenna 31 will be provided, connected to the radio transmitter apparatus 32. An oscillator 33 is connected to the apparatus 32 for supplying the carrier frequencies therefor. This oscillator will normally be short-circuited. The radio transmitter apparatus will be connected by the circuit 35 to a transmitter 36. A volume indicating device 38 may be included in the circuit 35 as well as a delay circuit 37 and a potentiometer device 70 for adjusting volume.

With apparatus of this type, noise from the oscillator associated with the radio transmitter on the ship might interfere with the received speech. Furthermore, radio "spill-over" or, in other words, the signals transmitted from the antenna 31 might cause interfering effects with the apparatus associated with the receiving antenna 25. Accordingly, the voice frequency operated relays 42 and 43 are provided. Relay 42, by means of a short circuit, normally disables the oscillator 33 and, hence, the radio transmitter apparatus and prevents noise from being picked up by the receiver. When the subscriber on the ship talks, the voice currents will be transmitted over the circuit 39, detector apparatus 40 and circuit 41 through the windings of relays 42 and 43 and will operate said relays. The operation of relay 42 will remove the short circuit from the oscillator 33 and allow the radio transmitter 32 to function. The operation of relay 43 will open the circuit connecting antenna 25 with radio receiver apparatus 26 and hence suppress noise and echoes from radio "spill-over". Relay 43 should be adjusted to operate and release not later than relay 42. The delay circuit 37 may be provided so that relay 42 will operate before the voice currents from the transmitter 36 reach the radio transmitting apparatus 32.

The apparatus on the ship will also include a pair of operator's receivers 46 and an operator's transmitter 45. By means of a switch 44, the operator's equipment may be connected to the circuit in various ways. For example, when the key 44 is in its normal position, as shown, one operator's receiver 46 is connected across the receiving circuit 28 and the other is connected by means of the circuit 50 to the output of the radio transmitter 32. Hence, the operator may monitor on the receiving circuit and also on the output of the radio transmitter. By referring to Fig. 3,

it may be seen how the circuit 50 with the inclusion therein of detector 80 may readily connect the operator's receiving set 46 to the output of the radio transmitter 32. When the key 44 is thrown to the downward position, the operator's transmitter 45 may be connected to the circuit 47 and thence be bridged across the transmitter circuit 35. In this manner, the operator may talk to the station on the shore. If the operator desires to talk to the ship's subscriber, the key 44 may be thrown to the upward position. The operator's transmitter 45 will then be connected to the circuit 28 and the subscriber's receiver 29. The subscriber's transmitter 36 will be connected over circuit 35 and thence over circuit 49 and the upper contacts of the switch 44 to the operator's receiver 46. At the same time, a short circuit 48 will be closed by the middle contacts of switch 44 across the circuit 41. Hence, the speech from the subscriber's transmitter 36 will not affect the relays 42 and 43 and as the radio transmitter 32 will hence be disabled, the conversation between the ship's operator and the ship's subscriber will not be transmitted to the station on the shore. It is pointed out that in a system of the above type, the anti-singing voice operated arrangement shown associated with the shore station may not be required to suppress echoes or singing. However, it serves a new and useful purpose in this system by providing the privacy feature of preventing retransmission of speech originating on the ship by the shore transmitter. It is pointed out that if desired the arrangements of Fig. 2 might be utilized for communication with similar apparatus on another ship instead of with shore apparatus.

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 claims.

What is claimed is:

1. In a system for establishing radio communication between two points, terminal apparatus at one of said points comprising a receiving circuit including radio receiver apparatus, a transmitter circuit including radio transmitter apparatus, a control circuit for normally maintaining the output of said radio transmitter apparatus in a disabled condition and for maintaining the input of said radio receiver apparatus in an operating condition, an operator's monitoring set connected to the output of said radio transmitter and to the output of said radio receiver, switching means for connecting said monitoring set to the input of said radio transmitter, and means controlled by said switching means in establishing said last mentioned connection for disabling said control circuit.

2. In a system for establishing radio communication between two points, terminal apparatus at one of said points comprising a receiving circuit including radio receiver apparatus, a transmitter circuit including radio transmitter apparatus, a control circuit for normally maintaining the output of said radio transmitter apparatus in a disabled condition and for maintaining the input of said radio receiver apparatus in an operating condition, an operator's monitoring set connected to the output of said radio transmitter and to the output of said radio receiver, switching means for connecting said monitoring set to the input of said radio transmitter, means controlled by said switching means in establishing said last mentioned connection for disabling said control circuit, an operator's transmitter, and means controlled by said switching means for connecting said operator's transmitter to said receiver circuit on the output side of the radio receiver apparatus or to said transmitter circuit on the input side of said radio transmitter apparatus.

In testimony whereof, we have signed our names to this specification this 18th day of September, 1929.

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