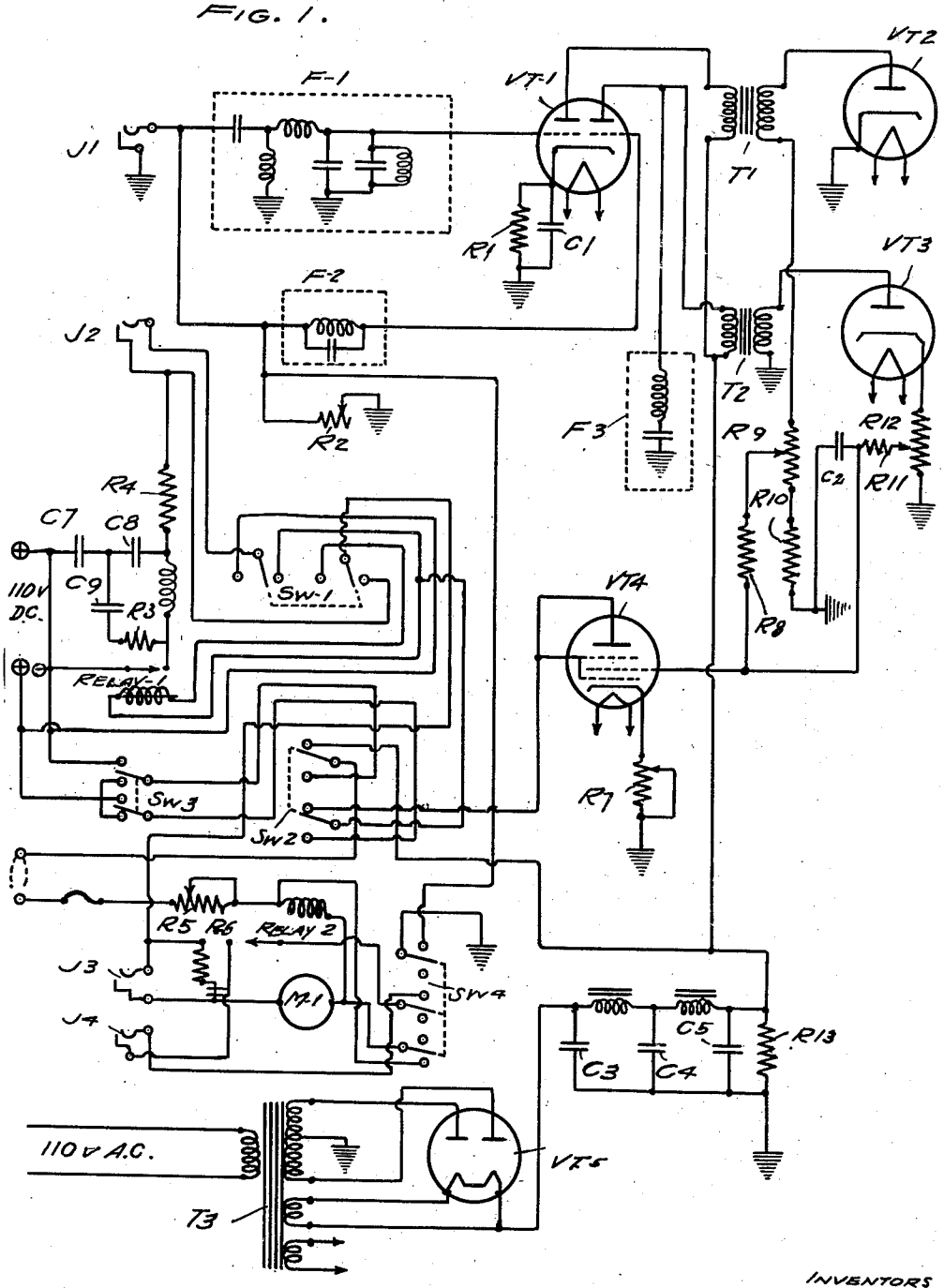
July 27, 1948. T. R. HARVILL ET AL 2,445,780

TELETYPE APPARATUS

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FIG. 1.



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FIG. 2.

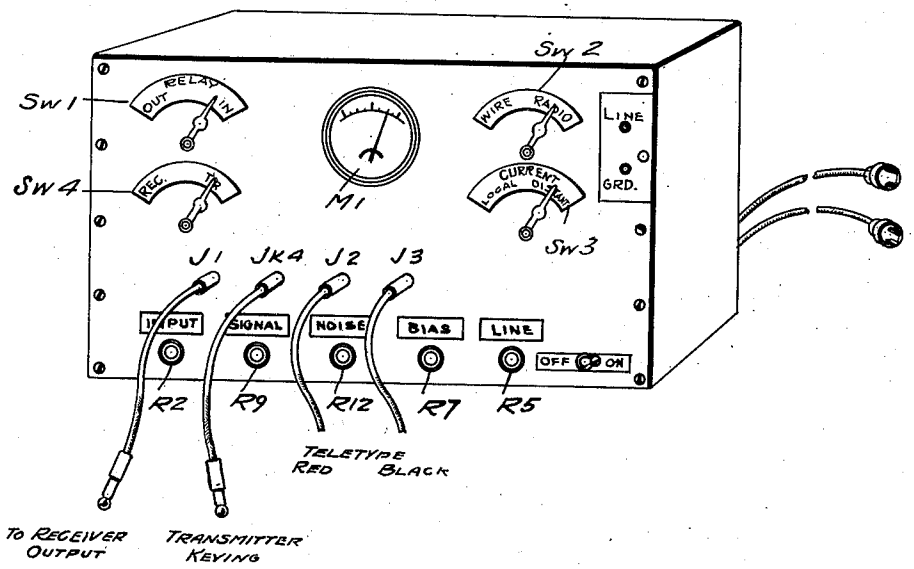
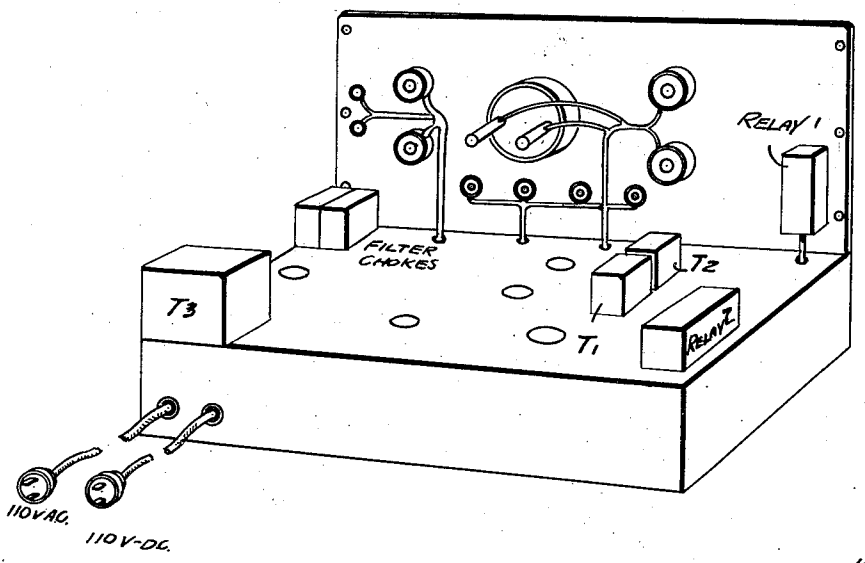


FIG. 3.



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TELETYPE APPARATUS

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4 Claims. (Cl. 178—66)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

This invention relates to improvements in methods and devices for transmitting and receiving Teletype messages by radio.

It is often desired to transmit and receive Teletype messages in localities where wire lines cannot be utilized or where wire lines have been made inoperative. It is, therefore, an object of this invention to provide a unit which can be interposed between standard military radio apparatus and Teletype apparatus to enable the transmitting and receiving of Teletype messages by radio.

The above and other advantageous objects are attained by the novel circuits and arrangements hereinafter described and illustrated by the accompanying drawings, forming a part hereof, and in which

Figure 1 is a schematic wiring diagram of the unit.

Figure 2 is a perspective front view of the unit.

Figure 3 is a rear view of the unit.

In accordance with the invention, the Teletype impulses can be transmitted by continuous wave or by tone; but continuous wave transmission using a beat frequency oscillator on the receiver for signal tone is simple and obtains greater distance. Use of tone transmission, however, is necessary in frequency modulated transmission. This type of transmission, using directive antenna would insure greater security than could be obtained by using continuous wave operation at high frequency. Use of CW on very high frequency should offer the same degree of security, but sufficient frequency stability cannot be easily attained for efficient operation.

For radio transmission, switch SW2 can be in either wire or radio position, with switch SW4 in the transmit position, which shorts the receiver input, placing the coil of relay R2 in the Teletype line circuit; and connects the relay points to transmitting jack J4, permitting keying of most army transmitters without circuit changes by connecting transmitter jack J4 to keying jacks of the radio transmitter with proper plugs.

During mark Teletype impulses the contacts of relay R2 are open and the transmitter is keyed only on the space impulses.

Referring to Figure 2, the radio Teletype line unit is shown to comprise switch SW1 for switching relays in and out, a switch SW4, for placing the unit in either the transmit or receive position, a milliammeter M—1, a switch SW2 for placing the unit in condition to either use wire or radio, and a switch SW3 for adjusting the current for local or distant reception. Cords extend from the unit for connection to a 110 v. A. C. supply and a 110 v. D. C. supply. Jack J—1 connects the unit to the

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output of a radio receiver (not shown); and jack J—4 connects the unit to a transmitter keyer. Jacks J—2 and J—3 connect the unit to Teletype apparatus. Mounted on the panel are input control R2, signal control R9, noise control R12, bias resistance R7, and line resistance R5.

For radio reception, any type of receiver that incorporates a beat frequency oscillator can be used to receive the continous wave Teletype impulses. Any type of receiver that covers the proper frequency range can be used when a 1200 cycle tone transmission is employed.

For reception the output of the radio receiver is coupled to jack J1, Switch SW1 can be in either position, but better results are obtained with the switch in the relay-in position. Of course, switch SW2 should be in the radio position. Switch SW3 is not in the circuit and switch SW4 is moved to the receive position, and a jumper is placed across the line and ground terminals.

From jack J1 the signal goes through a filter F1, which is designated to pass 1200 cycles and reject sharply all other frequencies. This 1200 cycle signal is amplified by the first triode section of tube VT1, then passes through audio transformer T1, and is rectified by tube VT2. A negative voltage is developed across resistances R9 and R10 and is impressed on the grid of the cut-off tube VT4, controlling the plate current of tube VT4. The plate circuit of this tube is the Teletype control circuit, and couples directly to the Teletype line section of the unit. The current in this circuit is 60 milliamperes on the mark impulses and zero amperes on the space impulses.

In order that satisfactory operation can obtain through considerable noise and interference, a noise circuit is used to minimize changes in the plate circuit of tube VT4 when noise or undesired signals of sufficient amplitude pass through the signal circuit. To accomplish this, a noise filter F2 passes all frequencies other than 1200 cycles to the grid of the second section of tube VT1. These signals are amplified, passed through transformer T2, rectified by tube VT3, and finally appear as a positive bias on the grid of tube VT4. The noise control resistance R12 must be properly adjusted until a balance of the undesired signals is obtained. Filter F3 provides additional filtering in the plate circuit of the noise amplifier by passing 1200 cycles to ground.

Resistance R7 in the cathode circuit of tube VT4 is adjusted until the plate current in the Teletype line circuit is 60 millamperes with no signal.

While the unit herein described employs 1200 cycles, it is obvious that any desired operating frequency can be used by employing the proper filters.

For wire operation, switch SW2 is moved to

the wire position, the strap across the line unit input is removed, and the wire lines are connected. The unit can then be employed as a conventional line unit, using either local or distant current supply. In both wire and radio operation the external 110 v. D. C. is necessary when operating with the receiving relay R1 in the circuit.

The power supply for the radio section of the unit comprises a 125 milliampere 300 volt power transformer T3, a full wave rectifier tube VT5, a filter circuit including capacitors C3, C4, C5 and two 15 henry filter chokes. A resistance R13 of 20 M ohm, 25 watt bleeder is employed to insure stability.

From the above description it will be seen that there has been provided a simple and effective unit which can be interposed between Teletype apparatus and standard radio transmitting and receiving apparatus to enable the transmission of Teletype messages by radio.

The above description is to be considered as illustrative and not restrictive of the invention, of which modifications can be made without departing from the spirit and scope of the appended claims.

The invention having been described, what is claimed is:

1. In a unit for receiving and transmitting Teletype messages by radio, a jack for coupling the unit to the output of a radio receiver, a switch for placing the unit in a condition to receive impulses by radio or by wire, an input filter to pass signals from the receiver only at a predetermined frequency, a double triode tube having a first triode section to amplify the signal of predetermined frequency, a first transformer, through which the amplified signal passes, a first rectifier tube to rectify the signal from first transformer, a cut-off tube, a first resistance connecting said first transformer secondary to ground, a connection from said first resistance to said cut-off tube grid to apply a negative potential thereto, a second input filter adapted to reject said predetermined frequency and pass all other frequencies including noise frequencies and connected to said second triode grid, a circuit from the plate of said second triode to ground, said circuit being series resonant to said predetermined frequency, a second transformer and a second rectifier to rectify the second triode output, a second resistance from the second rectifier cathode to ground, a connection from the second resistance to said cut-off tube grid to apply a positive potential thereto to neutralize said noise frequencies, and means for coupling the plate circuit of the cut-off tube to a Teletype apparatus to control the current of the Teletype circuit, said cut-off tube providing current to produce mark impulses and zero current to produce space impulses in Teletype apparatus.

2. In a unit for receiving and transmitting Teletype messages by radio, means for coupling the unit to the output of a radio receiver, means for placing the unit in a condition to receive impulses by radio or wire, a first input filter to pass signals from the receiver only at a predetermined frequency, means to amplify the signal of predetermined frequency, a first transformer and rectifier to rectify the signal, a first resistance connecting first transformer secondary to ground a cut-off tube, a connection from first resistance to cut-off tube grid to cause the rectified signal to develop a negative voltage on the grid to control the plate current thereof, a second input filter to reject said predetermined frequency and pass all other frequencies including noise frequencies, a second amplifier, a transformer and a rectifier to rectify said noise frequencies, a second resistance from the second rectifier cathode to ground, a connection from said second resistance to said cut-off tube grid to apply a positive potential thereto to neutralize said noise frequencies, and means for coupling the plate circuit of the cut-off tube to a Teletype apparatus to control the current of the Teletype circuit.

3. In a unit for receiving Teletype messages by radio, means for coupling the unit to the output of a radio receiver, a filter to pass signals only at a predetermined frequency, a cut-off tube having its plate circuit adapted to control the current in a Teletype apparatus circuit, and means for causing said signals to impress a negative voltage on the grid of the cut-off tube to control the plate circuit thereof and means for impressing a positive voltage on said cut-off tube grid to neutralize interfering frequencies, said first mentioned means comprising a first transformer and a rectifier to rectify the signal, a first resistance connected from the first transformer secondary to ground and a connection from the first resistance to the cut-off tube grid, said second mentioned means comprising a second input filter to reject said predetermined frequency and pass interfering frequencies, a second transformer and rectifier to rectify said interfering frequencies, a second resistance in the cathode to ground path of said second rectifier, and a connection from said second resistance to said cut-off tube grid.

4. In a unit for receiving Teletype messages by radio, an input filter to pass only a signal of predetermined frequency, a cut-off tube having its plate circuit adapted to control the current of a Teletype apparatus circuit, rectifier and resistance means to apply the rectified signal of predetermined frequency to the cut-off tube grid to impress a negative voltage on the grid thereof, a second input filter to pass signal at all frequencies except the predetermined frequency, and a second rectifier and resistance means to apply the output of the second filter to the cut-off tube grid to impress a positive voltage on the grid thereof to minimize changes in the plate circuit of the cut-off tube due to noise or undesired signals of sufficient amplitude to pass through the first filter.

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