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PILOT DEVICE FOR THE FREQUENCY KEYING OF SIGNALS TRANSMITTED BY AN OPERATING TELETYPEWRITER

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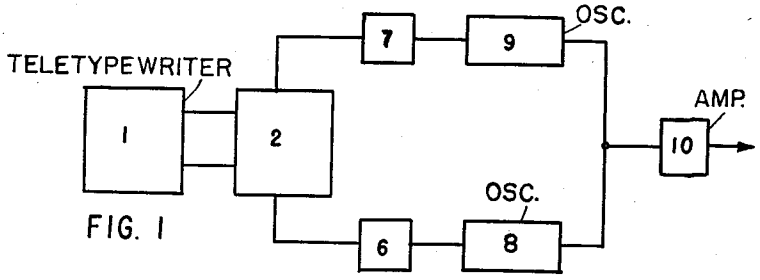


FIG. 1

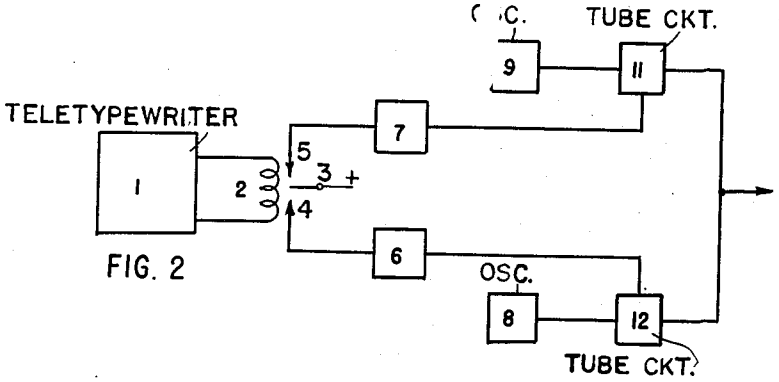


FIG. 2

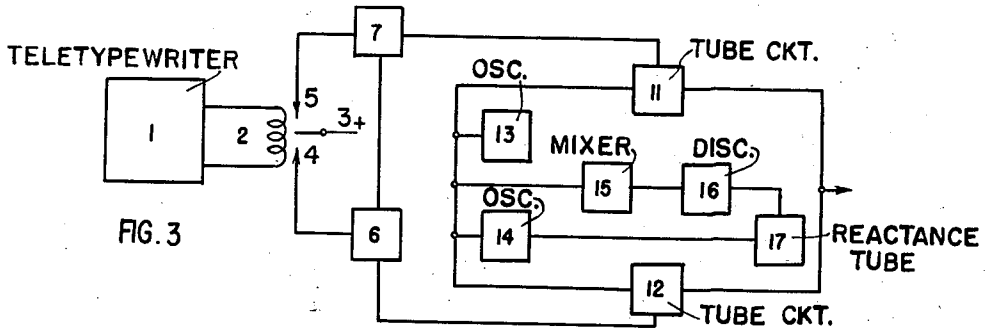


FIG. 3

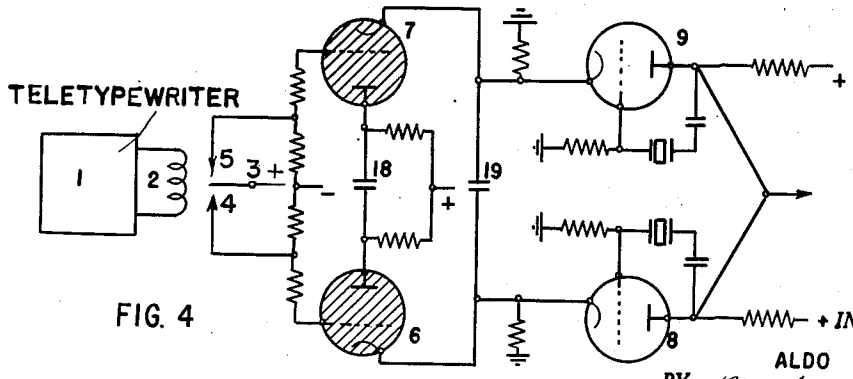


FIG. 4

+ INVENTOR.

ALDO CUPELLA

BY Mr. Walter Owen

ATTY.

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PILOT DEVICE FOR THE FREQUENCY KEYING OF SIGNALS TRANSMITTED BY AN OPERATING TELETYPEWRITER

Aldo Cupella, Milan, Italy, assignor of one-half to Soc. Metallotecnica, Milan, Italy, a corporation of Italy

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7 Claims. (Cl. 178—66)

In the modern communication technics, through the use of teletypewriters, carried out according to the system of frequency keying (emission of a work pulse at a given frequency and a rest pulse having an approximate but different frequency) either by radio way or cable, one of the most oustanding problems concerning the correct embodiment of the same kind of keying, consists of the manner by which the frequency keying of the two signals is effected.

The present invention relates to a pilot device for the frequency keying of signals transmitted either through radio way or cable, said device being driven by the transmission pulses emitted by a teletypewriter and represents a solution for the above problems.

The pilot device according to this invention is characterized by the presence of: a switching device for the controls submitted to the operating teletypewriter; two oscillators with frequency drift of the established value for the keying; two thyratrons driven by the above-mentioned switching device for alternatively blocking or releasing the oscillations emitted by said oscillators.

The pilot device is particularly characterized by the presence of an electromechanical, or electric, or electronic device driven by the teletypewriter (both with double or simple current) and suitable to effect the drive of the switching with the rhythm or cadence of the work and rest pulses emitted by the operating teletypewriter; two either free or frequency stabilized oscillators, provided with mechanical vibrating systems (of the quartz, magnetostriction, or other type) having oscillation frequencies spaced apart one another according to the frequency drift determined for the keying; two thyratrons driven by the above mentioned electromechanical, or electric, or electronic switching device, each of them being suitable to be switched on, thus switching off the other, and also suitable alternatively to block and to release, according to the work and rest pulse rhythm or cadence, the oscillation emitted by each of the two said oscillators by directly acting on the same oscillators or through a dividing tube.

The device is particularly characterized in that the electromechanical, or electric, or electronic device consists of a switching relay directly driven by the teletypewriter and suitable to effect contact switching according to the rhythm or cadence of the work and rest pulses emitted by the operating teletypewriter.

Said device is further in particular characterized by the fact that said two thyratrons drive the direct blocking and releasing of two quartz oscillators.

The device is moreover particularly characterized in that said two thyratrons drive the blocking and the release of the oscillations of two quartz oscillators through the direct drive of two dividing tubes.

Said device is also particularly characterized in that said two oscillators are free, and one of them is frequency coupled to the other through a reaction chain consisting of a mixer tube, a discriminating circuit, and a reactance tube.

The device is further particularly characterized in that each of said two thyratrons causes by its switching on, the switching off of the other by means of a positive pulse and a negative pulse sent on the cathode and on the plate, respectively, of the other thyratron through two suitable capacities.

Finally the same device is particularly characterized in that either the oscillators or the dividing tubes are alternatively blocked by the two preceding thyratrons by means of a high positive tension drive or control on their cathode.

Some forms of embodiment of the invention are shown, only by way of example, in the accompanying drawing, wherein:

Figs. 1, 2 and 3 show in diagrammatic form three different embodiments of the device;

Fig. 4 shows a practical form of embodiment of the scheme represented in Fig. 1.

According to Fig. 1, the teletypewriter 1 sends its direct current pulses to the electromechanical, or electric, or electronic device 2, which alternatively causes the connection of said thyratrons 6 and 7 each of the same determining by its own switching on the switchin off of the other. The quartz oscillators 8 and 9, frequency drifted one another of that value fixed for the frequency keying, are thus alternatively blocked by the thyratrons 6 and 7. In such a way, the dividing stage 10 alternatively amplifies the signals of the two different frequencies. This frequency keying system presents mainly the advantage of allowing the frequency drifted pulses not to be discontinuous and their wave front be always steep and constant.

According to Fig. 2, the device 2 of Fig. 1, consists of a switching relay 2 that when driven by the pulses of the machine 1, by closing the central contact 23, alternatively on the side contacts 4 and 5 according to the pulse rhythm of the teletypewriter causes alternatively the connection of the thyratrons 6 and 7. The oscillations emitted by the two quartz oscillators 8 and 9 are alternatively blocked through the blocking of the dividing tubes 11 and 12 caused by the thyratrons 6 and 7.

According to Fig. 3, the free oscillators 13 and 14 send their signal to the mixer 15 generating an output signal having a frequency equal to the difference between the frequencies of said two oscillators (corresponding to the frequency drift, previously fixed for the keying). The output signal of the mixer 15 controls the discriminator 16 which, through the reactance tube 17, controls the frequency of the oscillator 14. Said oscillator 14 remains therefore frequency coupled to the oscillator 13 through the reaction mesh (mixer 15—discriminator 16—reactance tube 17), and its frequency is drifted in respect of that of the oscillator 13 of the amount established by the zero of the discriminator 16. The oscillations in this way delivered by the oscillators 13 and 14 are alteratively blocked by the dividing tubes 11 and 12 driven by the thyratrons 6 and 7.

According to Fig. 4, the central contact 3 of the relay 2 is maintained to a positive potential, and therefore, when the contact 3 is closed across the contacts 4 or 5, either the thyratron 6 or that 7 is started respectively, being that their grids are brought from a negative blocking potential to a positive starting potential because of the drive of relay 2. The starting of each of said two thyratrons, thru the capacitor 18 generates a negative pulse on the plate of the other and thru the capacitor 19 a positive pulse on the cathode of the other. The other thyratron which at the same time receives the negative pulse on its plate and the positive pulse on its cathode, is immediately cut off. The thyratrons 6 and 7 are there-

fore alternatively started according to the relay 2 controls. The operation of the thyratron 6 causes the quartz oscillator 8 to block by means of a high positive tension on its cathode. The operation of the thyratron 7 causes the quartz oscillator 9 to block by means of the positive tension pulse on its cathode. In this way the oscillators 8 and 9 are alternatively blocked according to the rhythm or cadence of the pulses emitted by the teletypewriter 1.

It is to be understood that the embodiments diagrammatically shown and described herein before are only some examples of the invention which may be carried out within the scope of the essential concepts as summarized in the following claims.

What is claimed is:

1. A circut arrangement for use in the transmitter of a frequency shift telegraphy system including a switching relay which is directly driven by a teletypewriter for controlling the switching of the frequency of said transmitter, said relay having two operative positions on opposite sides of an intermediate non-operative position with a contact in each of the two operative positions, said arrangement comprising two thyratrons, each thyratron having a grid which is connected by resistance means to a source of negative potential, means responsive to operation of said switching relay to said two operative positions alternately for connecting a source of positive potential through the respective contacts to the grids of said thyratrons to thereby alternately initiate conduction therein, neither thyratron having its grid connected to the source of positive potential during transfer periods in which the relay is intermediate said operative positions, the thyratron in which conduction was last intiated remaining conductive during said transfer periods, means for extinguishing either thyratron responsive to operation of the other, an output circuit, means for obtaining a signal at said output circuit at a first frequency responsive to conduction in one said thyratron and at a second frequency responsive to conduction in the other said thyratron.

2. A circuit arrangement for use in the transmitter of a frequency shift telegraphy system including a keying device having two operative positions on opposite sides of an intermediate non-operative position for controlling the switching of the frequency of said transmitter, said arrangement comprising two thyratrons, each having a cathode and an anode, a first capacitor connected in circuit between said cathodes, a second capacitor; connected in circuit between said anodes, means for initiating conduction of said thyratrons alternately responsive to operation of said keying device to said two operative positions respectively, means responsive to the initiation of conduction in either said thyratron for applying a positive pulse and a negative pulse through said capacitors to the cathode and the anode respectively of the other thyratron to extinguish it, an output circuit, means for obtaining a signal at said output circuit at a first frequency responsive to conduction in one said thyratron and at a second frequency responsive to conduction in the other said thyratron.

3. A circuit arrangement for use in the transmitter of a frequency shift telegraphy system including a keying device having two operative positions on opposite sides of an intermediate non-operative position for controlling the switching of the frequency of said transmitter, said arrangement comprising two thyratrons, starting means for initiating conduction of said thyratrons alternately responsive to operation of said keying device to said two positions respectively, the starting means being ineffective with respect to both thyratrons during transfer periods in which the keying device is intermediate between said operative positions, the thyratron in which conduction was last initiated remaining conductive during said transfer periods, means for extinguishing either thyratron responsive to operation of the other, an output circuit, two sources for supplying signals at separate frequencies to said output circuit, means responsive to conduction in one said thyratron for blocking the supply of signals from one said source and responsive to conduction in the other thyratron for blocking the supply of signals from the other said source to said output circuit.

4. A circuit arrangement according to claim 3 wherein each said source includes a quartz-crystal-controlled oscillator, and said means for blocking the supply signals comprises means for blocking operation of said oscillators alternately.

5. A circuit arrangement according to claim 3, wherein each said source includes a tube stage connected in circuit between an oscillator and the output circuit, and said means for blocking the supply of signals comprises means for blocking said tube stages of said sources alternately.

6. A circuit arrangement according to claim 3, wherein each said source includes an oscillator; an automatic frequency control circuit comprising a mixer coupled to the outputs of said oscillators, a discriminator coupled to the output of said mixer, and a reactance tube coupled between said discriminator and one of said oscillators for maintaining the frequency of the last said oscillator at a fixed difference from the frequency of the other said oscillator.

7. A circuit arrangement according to claim 3, wherein each said source includes at least one tube having a cathode, and said means for blocking the supply of said signals is made effective by applying a positive potential to said cathode responsive to conduction in the corresponding one of said thyratrons.

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