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PORTABLE INTERFERENCE TRANSMITTER

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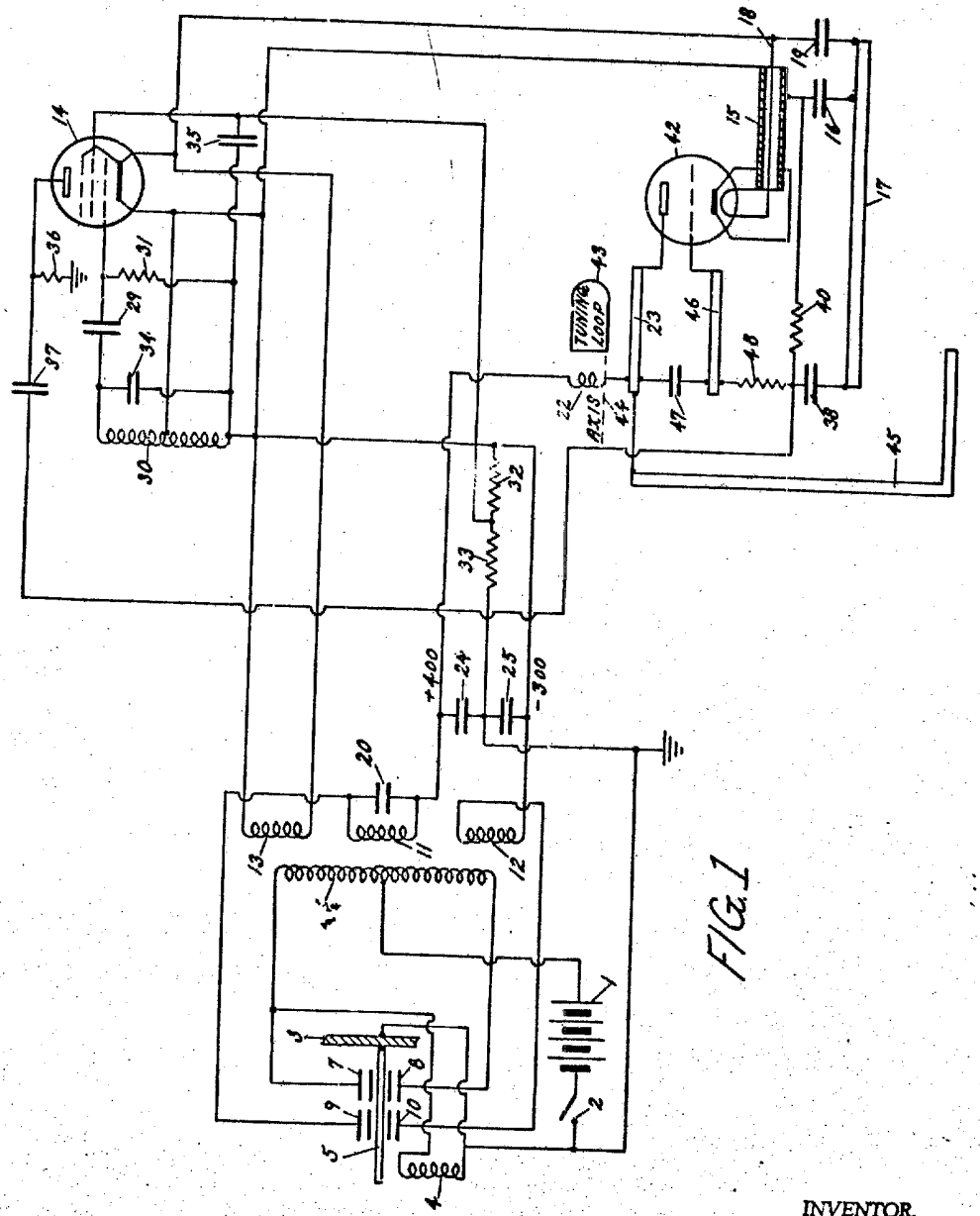

FIG. 1

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PORTABLE INTERFERENCE TRANSMITTER

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

This invention relates to radio devices and more particularly to a device and method for effectuating a controlled interference of radio signals and the like, which makes them substantially unintelligible upon reception.

Under some conditions it is highly desirable to minimize or destroy the accuracy of, and information conveyed by, radio signals.

The objects of the present invention comprise the provision of a small, compact, self-contained and self-operating device for the contemplated purpose; a device capable of successfully radio blanketing an appreciable area and range of signals; a radio transmitter whose repetition rate is not impired by the presence of externally originated pulses; a device comprising a squegging transmitter that is characterized by a positive control over its quench cycle; a device that provides a continuously moving close pattern of railings across the screens of cathode ray tubes at receivers to obliterate any information trace thereon; a device wherein the quench cycle frequency may be made quite high, as in the order of 60 kilocycles and the like, that effectually prevents external signals from taking control of the oscillations of a squegging oscillator part of the device; and a device that can be produced from a minimum number of parts at a minimum expense and that can be assembled and rendered operative with a minimum expenditure of time and effort and that is not objectionably conspicuous.

With the above and other objects in view that will be apparent to those who are informed in the field of radio devices from the following description, an illustrative embodiment of the present invention is shown in the accompanying drawing, wherein;

Figure 1 is a schematic drawing of a preferred circuit for the device that comprises the present invention.

In the accompanying drawing of a self-contained device that embodies the present invention a battery fed power source supplies electrical energy to a transmitter during the active life of the device.

The battery 1 is preferably of a lead-acid type that will provide the device with a useful life of approximately one hour.

The negative post of the battery 1 is grounded through a switch 2 to the enclosing and supporting frame 3 of the device and to one end of a solenoid 4 that operates a vibrator 5 to provide alternating current to a transformer primary winding 6, through the contacts and connectors shown. The opposite end of the solenoid 4 winding is connected to one end of the transformer primary winding 6. The positive post of the battery 1 is tapped into the transformer primary winding 6 intermediate the ends thereof so that upon the depression of the switch 2 the posts of the battery 1 are connected continuously through the solenoid 4 and a part of the transformer primary winding 6. The opposite ends of the transformer primary winding 6 are connected to the opposed pair of vibrator contacts 7 and 8.

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Another pair of opposed vibrator contacts 9 and 10 are connected to one end of a second secondary winding 11 and to one end of a third secondary winding 12, respectively, that are fed induced current from the primary transformer winding 6. The first secondary winding 13 bridges the filament of a triggering oscillator 14, such as a 9001 pentode or the like, one connection continuing to one end of an outer conductor 15 of a coaxial line that is connected through a condenser 16 to an insulated aluminum strip 17, and the other connection connected to the corresponding end of a central conductor 18 of the coaxial line and continuing through a condenser 19 to the aluminum strip 17.

The second secondary winding 11 is bridged by a condenser 20. The end of the second secondary winding 11 that is remote from its connection with the vibrator contact 9, is connected through an inductor 22 to one 23 of a pair of parallel wire tank circuit units. A condenser 24 by-passes radio frequency to ground from the input end of the inductor 22. Another condenser 25 by-passes radio frequency to ground from the end of the third secondary winding 12 that is not connected with the vibrator contact 10.

The transmitter portion of the circuit comprises the triggering oscillator tube 14, the control grid of which is connected through a condenser 29 to an inductor 30 that is in parallel with a resistor 31 and thence to the —300 volts terminal of the vibrator 5 power supply. The inductor 30 is shunted by a capacitor 34. The screen grid of the tube 14 is connected through a capacitor 35 to the end of the resistor 31 that is remote from its connection with the control grid of the tube 14, and continues to the end of the inductor 30 that is remote from its connection with the control grid of the tube 14. The screen grid of the tube 14 is also connected to between the resistors 32 and 33. The suppres-

sor grid of the tube 14 is connected within the tube to the filament thereof. One contact of the filament of the tube 14 is tapped intermediate the ends of the inductor 30. The two contacts of the filament of the tube 14 are connected to the conductors between the opposite ends of the transformer first secondary coil 13 and the inner conductor 18 and the outer conductor 15 of the coaxial line so that these conductors are bridged by the filament of the tube 14 intermediate the ends thereof. The plate of the tube 14 is grounded through a resistor 36 and the conductor continues through a capacitor 37, a resistor 48 and a tank circuit wire 46 to the control grid of a self-quenched, or squegging, oscillator tube 42.

The triggering oscillator 14 forces the squegging oscillator 42 to pulse at a definite rate that is higher than any radar pulse rate that is picked up by the device. The squegging oscillator 42 comprises a cathode that has both of its terminals connected to the end of the outer conductor 15 of the coaxial line that is remote from the end of the outer conductor 15 that is connected with the transformer first secondary winding 13. One terminal of the heater of the tube 42 is connected to the same end of the coaxial line outer conductor 15 and its other terminal connected to the corresponding end of the coaxial line inner conductor 18. A tuning loop 43, or other suitable means, that is adapted for rotation about an axis 44 in and out of the field of the inductor 22, is provided for adjustably tuning the inductor 22. The wire 23, of the pair of parallel wire tank circuit units, is connected at one end to the plate of the tube 42 and at its opposite end to the choke 22 and to a sending antenna 45. The other wire 46, of the pair of parallel wire tank circuit units, is connected at one end to the grid of the tube 42 and its opposite end in connected to the antenna connected end of the wire 23 through a capacitor 47 and through the resistor 48 and the capacitor 38 to the aluminum strip 17.

In operation the various components of the device preferably are enclosed within a conducting metal container that provides the ground 3. One manner of using the device is to drop it over areas in groups of units, that are individually provided with parachutes, balloons or the like, from altitudes that permit the use of the full life of the battery 1.

When functioning, the jammer produces a series of closely spaced pips upon the screens of cathode ray tubes so that the pips move continuously across the screens of the sets. The generated and emitted pulses are of sufficient amplitude, frequency and intensity so that the plane position indicating reflection pips upon the sets are effectually obliterated.

The operation within the jammer set comprises the induction of alternating current from the battery 1 in the three transformer secondary windings 11, 12 and 13 by operation of the solenoid 4 and vibrator 5 in known manner. The alternating current so provided is fed through the circuits and components shown and emitted as radio frequency energy pulsations from the sending antenna 45.

The squegging oscillator 42 is associated with a very high frequency oscillator circuit that includes the parallel wire tank circuit of which the wires 23 and 46 form parts, and to which the antenna 45 is connected. The tuning loop 43 provides means by which the set is pretuned on the frequency of the signal that it is desired to jam. The filament supply for the tube 42 is shielded within the coaxial line that comprises the outer conductor 15 and the inner conductor 18. The plate-cathode voltage supply for the tube 42 is derived from the transformer second and first secondary windings 11 and 13.

The triggering oscillator 14, and the oscillating circuit that is associated therewith, generate a quench voltage supply. The plate-cathode voltage supply for the tube 14 comes from the transformer second secondary winding 11 and from the transformer third secondary winding 12.

The oscillating quench signal that is derived from the plate of the triggering oscillator tube 14 is applied directly to the grid of the squegging oscillator tube 42 and drives it alternately positive and negative to quench and regenerate the oscillations of the tube 42 once for each cycle. The quench cycle is timed to a much faster rate than the pulse repetition rate of the radar radio energy that is to be jammed, and hence the pulse of the received signal cannot take control of the oscillations of the squegging oscillator tube 42. In general, the quench frequency will be incommensurate with the pulse repetition rate of the signal to be jammed so that a general blur over the whole field of the presentation upon the screen of the receiving cathode ray tube will be produced, thereby obscuring any true echoes which might appear thereon.

It is to be understood that the particular combination of circuits and components that are shown and described herein, have been presented for the purposes of illustrating and describing a suitably operating embodiment of the present invention and that various modifications, changes and substitutions may be made therein without departing from the present invention as defined by the appended claims.

What we claim is:

1. A jammer for jamming radio pulse signals having a predetermined repetition rate, comprising a triggering oscillator supplying an oscillating quench signal, and a squegging oscillator to the grid of which the oscillating quench signal from said triggering oscillator is applied directly to drive the grid alternately positive and negative and thereby quenching and regenerating the oscillation of the squegging oscillator once for each cycle of said triggering oscillator, the frequency of said triggering oscillator being higher than said repetition rate.

2. A radio energy interference signal generating set for impairing the usefulness of a radio pulse-echo object detection system, comprising a power source, a triggering oscillator energized by said power source to supply an oscillating quench signal, and a squegging oscillator receiving the signal from said triggering oscillator alternately to quench and regenerate the oscillation of said squegging oscillator once for each cycle of said triggering oscillator, the frequency of said triggering oscillator being higher than the pulse repetition rate of said detection system.

3. A jammer for supplying signals that are free from being locked to the pulse repetition rate of another signal, comprising a triggering oscillator supplying an oscillating quench signal, a squegging oscillator to the grid of which the oscillating quench signal from said triggering oscillator is applied to drive the grid alternately positive and negative to quench and regenerate the oscillation of said squegging oscillator once for each cycle of said triggering oscillator, a power means for supplying electrical energy to said squegging oscillator and to said triggering oscillator, and an

antenna for emitting output of said squegging oscillator, the frequency of said triggering oscillator being higher than said repetition rate.

4. A jamming transmitter for jamming radio pulse signals, comprising a triggering oscillator supplying a periodic quench signal, a squegging oscillator whose squegging operation is positively controlled by the quench signal from said triggering oscillator, said quench signal being normally of a higher frequency than the pulse rate of a signal to be jammed.

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