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OSCILLATOR

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Fig. 1.

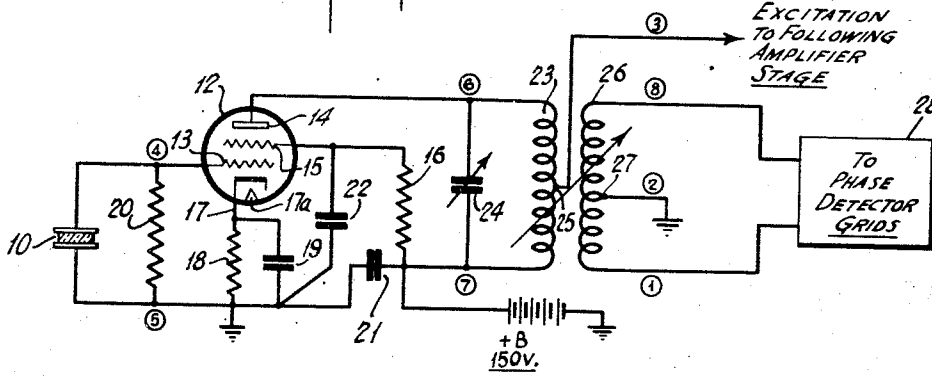


Fig. 2.

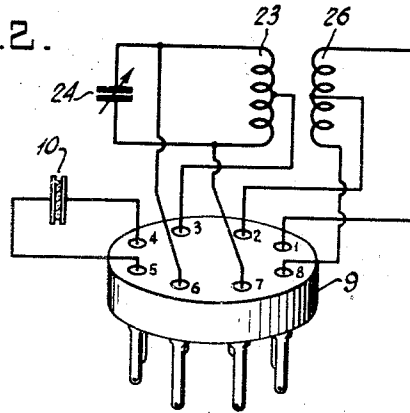
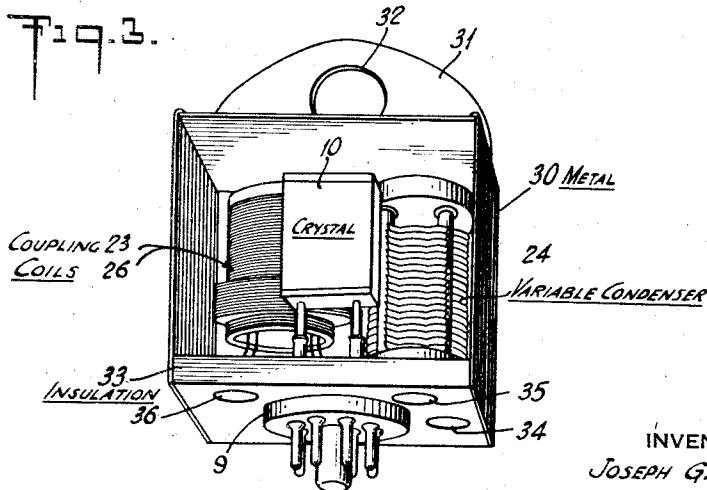


Fig. 3.



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OSCILLATOR

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2 Claims. (Cl. 250—36)

1

This invention relates to new and useful improvements in oscillators and is particularly directed to a crystal oscillator arrangement for an automatic tuned transmitter, although, of course, it is not specifically limited thereto.

An object of this invention is to simplify and improve the arrangement of plug-in crystal oscillator units which will facilitate improved operations of oscillator circuits generally.

Another object of this invention is to provide an oscillator which will cover a large frequency range, for example from 2 to 20 megacycles with extremely short leads connecting each circuit element.

A feature of this invention is the combination of a tuned plate circuit with a crystal in such a manner that when the crystal is changed, the proper plate circuit will also be selected by the same operation. Also, additional means are provided to supply voltages properly phased for exciting automatic tuning apparatus used in the transmitter.

Although plug-in coils per se are old in the art, the specific arrangement of this invention provides a novel oscillator in which a tuned plate circuit including an inductor and a capacitor is joined with the crystal in such a manner that when the crystal is changed the proper plate circuit will also be selected by the same operation. Combined with the above mentioned arrangement additional means is provided whereby voltages are properly phased to supply excitation used for automatic tuning of the transmitter.

This invention will best be understood by referring to the accompanying drawing in which:
Fig. 1 is a schematic diagram of a crystal circuit of this invention,

Fig. 2 shows the electrical oscillator elements incorporated in the plug-in unit, and

Fig. 3 is a perspective view of the plug-in oscillator unit with one side of the cover removed.

Referring now to Figs. 1 and 2 of the drawing, the various circuit elements of the plug-in unit are connected to the prongs or pins 1 to 8, inclusive, which are arranged to fit the standard octal tube socket. These pins are secured to an insulating base 9 and serve as electrical terminals for the plug-in unit. The circuit arrangement shown in Fig. 1 comprises a crystal and its holder 10 having connections to pins 4 and 5. An oscillator tube 12 which is of the screen grid type has its grid 13 also connected to pin 4. The anode 14 connects to pin 6. A screen grid 15 is connected through a resistance 16 to pin 7. The cathode 17 is connected to ground through a re-

2

sistor 18 and a bypass condenser 19. A heater 17A connects to any suitable voltage source, not shown. A grid bias resistor 20 is connected across pins 4 and 5. A bypass condenser 21 is connected from pin 7 to ground. A bypass condenser 22 is connected from the screen grid 15 to ground. An input coil 23 is connected to pins 6 and 7 and has a tuning condenser 24 connected in parallel therewith. A midpoint connection 25 connects with pin 3 which in turn is connected to the excitation device of the following stage to be excited by the crystal oscillator. In variable coupling relation to input coil 23 there is an output coil 26 having its outer connections made to pins 1 and 8 and its center connection 27 to pin 2. Connections are also made from pins 2 and 8 to phase detector grids shown in the block diagram 28.

Referring now to Fig. 3, a metal casing 30 which is provided with a handle 31 having an aperture 32 for providing a better grip on the handle, is arranged to house the input and output coils 23 and 26, crystal holder 10 and variable condenser 24. On the bottom portion of casing 30, there is an insulating cover 33 on which base 9 is secured. Apertures 34, 35 and 36 are provided in cover 33 to permit variation in the coupling of coils 23 and 26, also to vary condenser 24. The circuit elements are arranged in casing 30 so that there will be a minimum amount of inductance in the leads connecting to the coils, crystal and variable condenser.

As these plug-in units are for covering a frequency range from 2 to 20 megacycles, there will be several such units. For example, five plug-in units were provided in a transmitter which was constructed, each plug-in unit having a different frequency for the crystal 10 and a different number of turns on coils 23 and 26. Likewise, the variable condenser 24 will be of a different capacity. It is obvious that switching means may be employed in place of plug-in units described to obtain the same result.

In the operation of this device, the oscillator tube 12 is mounted on a suitable panel of a transmitter which is provided with a conventional octal tube socket to receive the plug-in unit shown in Fig. 3. Whenever it is desired to change the frequency range of the transmitter, a plug-in unit is selected for the proper frequency range, and as the coils and condensers are within the same casing, the proper plate circuit will be selected by the same operation. Also, additional means are provided whereby the voltages are properly phased to supply excitation used for au-

3

tomatic tuning of a transmitter. This means may comprise a coil 26 as indicated in Fig. 1, which is arranged so that when the crystal is changed, the coil 26 of proper value will be associated with the plate coil 23.

While I have indicated and described a system of my invention, it will be apparent to one skilled in the art that my invention is by no means limited to the particular device shown and described, but that many modifications may be made without departing from the scope of my invention.

What I claim is:

1. A crystal oscillator plug-in unit comprising a metallic housing member having electrical terminals, a piezo-electric crystal within said housing member, said crystal being connected to certain of said terminals and the grid cathode circuit of an electron discharge device, a variable condenser within said housing member, a coupling device having input and output coils each one of which has a center tap within said housing member, the outer ends of said input coil being connected to said terminals and said condenser and to the anode cathode circuit of said electron discharge device, the center tap of said input coil being connected to the excitation terminals of a following stage, the outer ends of the output coil being connected to the terminals of a detector stage and the center tap of said output coil being connected to a terminal, and means for maintaining said terminal at ground potential.

4

2. A crystal oscillator plug-in unit comprising a metallic housing member having an insulating base and a plurality of electrical terminals, a piezo-electric crystal within said housing member, said crystal being connected to certain of said terminals and the grid cathode circuit of an electron discharge device, a variable condenser within said housing member, a coupling device having input and output coils each one of which has a center tap within said housing member, the outer ends of said input coil being connected to said terminals and said condenser and to the anode cathode circuit of said electron discharge device, the center tap of said input coil being connected to the excitation terminals of a following stage, the outer ends of the output coil being connected to the terminals of a detector stage and the center tap of said output coil being connected to a terminal, and means for maintaining said terminal at ground potential.

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