Gate Dipper

Figure 23 shows an extremely simple resonant dip oscillator. It can be used over a wide range of frequencies by the use of plug-in coils. With such instruments, the coil generally projects at one end of the case, so that it can be brought near to the inductors of other tuned circuits.

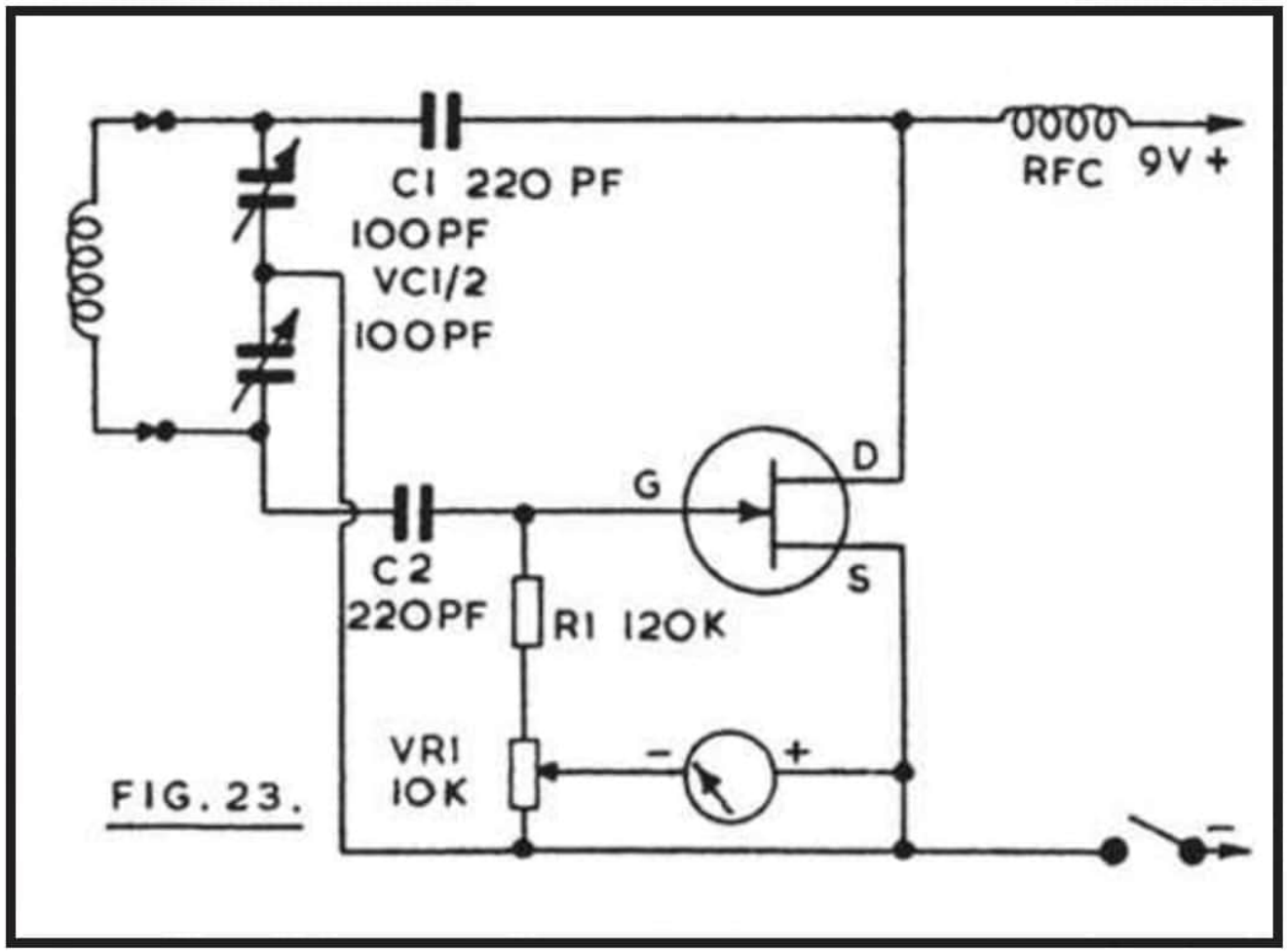

FIG. 23.

VC1/2 is a 2-gang capacitor, 100pF each station. Feedback from the FET drain by C1 results in oscillation, and rectification in the gate circuit produces a small current through R1 and VR1. When a tuned circuit under investigation is inductively coupled to the dipper coil, and both are tuned to the same frequency, RF energy is absorbed. As a result, the current through R1 falls, and this is shown by a dip in the meter reading. Sensitivity is controlled by the setting of VR1. A 50uA meter is most satisfactory, as the dip is small for average degrees of coupling of the dipper to the tuned circuit being checked. However, this is no particular disadvantage, as a clear dip is produced, to show resonance.

Such an instrument is generally used to check the frequencies of oscillator, multiplier and power amplifier coils in transmitting equipment, or the frequency of circuits in converters, HF or VHF receivers, and similar apparatus. These tests can be made with no voltages present on the equipment. To check the frequency of a circuit, the dipper coil is held near the inductor of the circuit, and VC1/2 rotated until the dip is seen, showing resonance. The frequency can then be read from the dipper. To set a circuit on frequency, tune the dipper to this, couple it to the inductor, and set the core or trimmer of the latter until the dip is obtained. Initially, it is usual to have dipper and equipment coils near each other, for ease in finding the dip. The dipper coil is then moved a little away, to loosen coupling, as very tight coupling may upset frequency readings. Coupling is maximum with the inductors in line, near together, but other angles and positions will provide coupling.

The, dipper coils can be wound on 1 in diameter paxolin tubes, which can have two pins fitted one end, or can be attached to valve bases from old octal or similar valves. A coil for 3-7MHz can have 70 turns of 24swg enamelled wire side by side. For 6-16MHz, the winding can be twenty six turns of 24swg enamelled wire, side by side. For 17-46MHz, nine turns of 18swg enamelled wire, side by side, can be used. For these frequencies, a 2.5mH or similar RF choke is used. The HF and VHF FETs with an upper frequency limit of 100MHz or higher will be found to work well

here. The upper frequency limit at which the dipper can be used depends on the RF choke, short leads with low loss construction, and a VHF FET. When oscillation ceases, no meter reading is obtainable.

Drain Dip Oscillator

This instrument, shown in Figure 24, allows similar tests to those obtained with the Gate Dipper, Figure 23. However, the meter M is now incorporated in a bridge circuit, with R2 and the FET on the positive side, and VR1 and R3 on the negative side. In use, VR1 is set so that M indicates about half scale. Resonance between the dipper coil and a coil in equipment being checked then causes a drop in the meter reading.

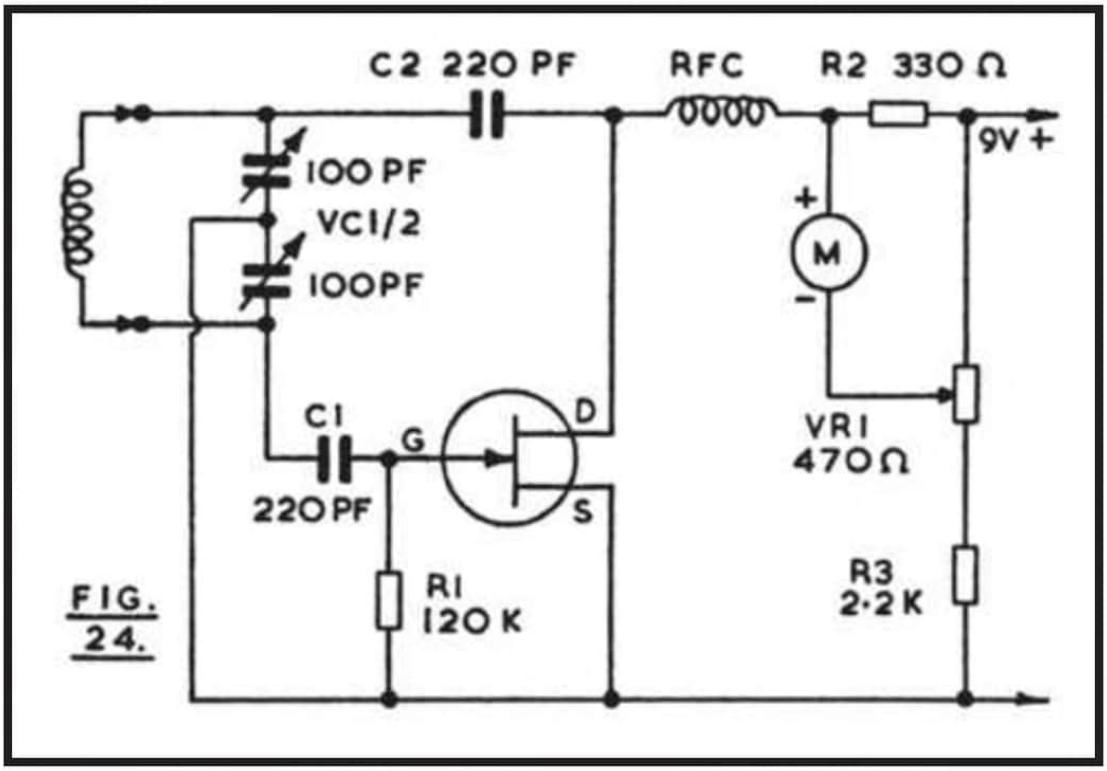

FIG. 24.

Due to the bridge circuit and fact that this is controlled by the drain current, the change present to operate the meter is much larger than in Figure 23, and it will be found that a 1mA instrument can be fitted. With a very sensitive meter, readings can tend to go off the scale too easily, so that frequent adjustment of VR1 is needed.

Uses of this instrument are as described for Figure 23. It is convenient to use a separate on-off switch for the battery circuit, in both dippers, so that the potentiometer can be left set for suitable results.

Crystal Markers

A crystal marker is commonly used by short wave listeners or amateurs to find or check frequency bands, to determine band limits, or to provide exact calibration of a receiver or other equipment. In fact, many of the better communications type receivers