A Magic-Eye GDO

NEAT TEST INSTRUMENT GIVING VISUAL DISPLAY

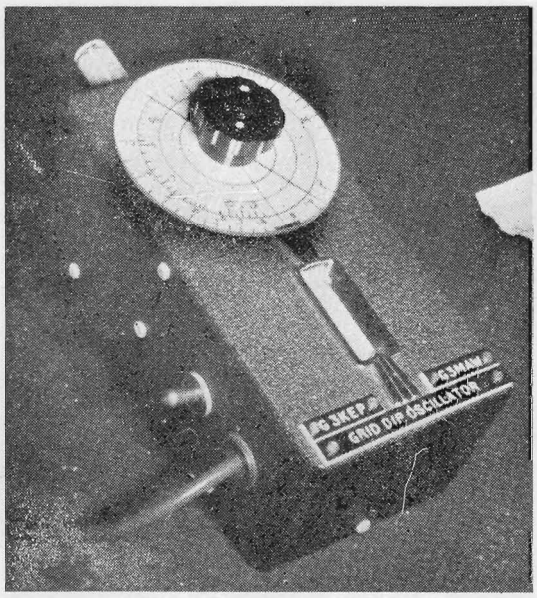
D. PRATT (G3KEP) & D. NOBLE (G3MAW)

If an AC voltage is applied to the deflector electrode of a "magic-eye" tuning indicator, the edges of the trace will appear fuzzy. In several of the older types of tuning indicator, the deflector electrode is connected internally to the triode DC amplifier anode, thus making the triode section unsuitable for AC circuits. The recent introduction of tuning indicators with separate deflector electrode connection has made possible the use of the triode section in amplifier or oscillator circuits without causing any detrimental effect to the indicator display.

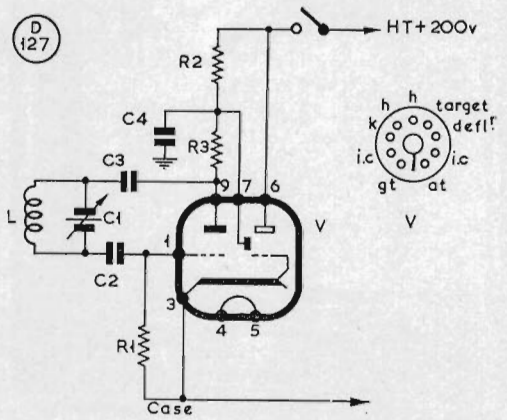
A practical circuit employing this principle is a Grid Dip Oscillator using one of these valves alone as both oscillator and "meter." By experiment, it has been found that the Mullard EM84 will oscillate quite readily up to Band I frequencies with a suitable L/C ratio, but this may be subject to variation between individual specimens. (The manufacturers will not give any working conditions for the EM84 triode section in such applications.)

The circuit design consists of a Colpitts oscillator, thus eliminating the need for a tapped or double-winding coil. The triode anode is connected through a suitable load impedance to the deflector electrode. An RF choke can be used as the anode load, but a 22,000-ohm resistor was found to suffice. The deflector electrode is suitably decoupled and fed through the usual DC anode load resistor of 1 megohm; the cathode is connected direct to chassis, and the target to the HT rail. A high value of grid leak is used not only to avoid the loss of RF voltage applied, but also so that the variation of grid current will cause as large as possible a variation of grid voltage. Thus, the mean triode anode current will change, so causing the deflector volts to vary, and hence the shadow length.

The prototype was constructed in a case that was, perhaps, larger than necessary. The size of case was mainly dictated by the size of tuning condenser available; this was a (fairly small) normal broadcast 2-gang 500 $\mu\mu$F per section stripped to one-fifth the number of plates. By using a smaller condenser, however, the size of the unit can be reduced considerably. The coils were wound on Denco octal-based plug-in formers without cores. Suggested winding data for ranges up to 13 mc



General view of the Grid Dip Oscillator described in the article. The dial is calibrated for the ranges covered, and the coil in use plugs in at the top of the box. The magic-eye looks out from beneath the dial.



Circuit of the magic-eye GDO described by G3KEP/G3MAW. The values for L are given in the table. C1 is 100+100 $\mu\mu$F connected series-gap; C2, C3 are 82 $\mu\mu$F; C4 is .002 μF; R1, R2 are 1 megohm each; R3 is 22,000 ohms; and the valve is an EM84, which has the deflector connection brought out separately.

COIL DATA

Coil One: 1800-4900 kc approx., 160 turns No. 39 enam. close-spaced on ½-in. dia. former.

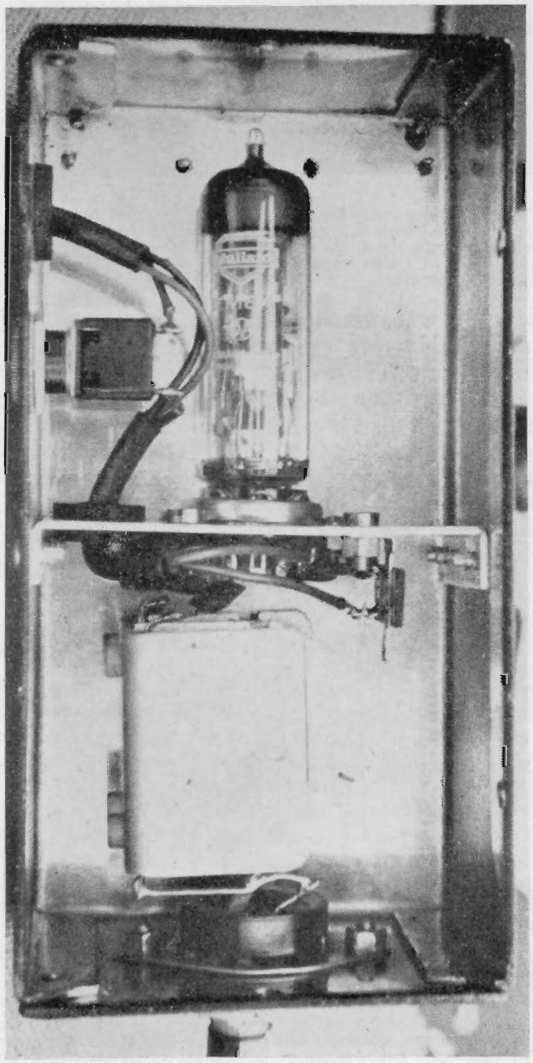
Coil Two: 4800-13000 kc approx., 55 turns No. 29 enam. close-spaced on ½-in. dia. former.

Note: Use Denco 0.5in. plug-in formers in polystyrene, type Yellow for Coil One and White for Coil Two.

is given in the Table. Coverage for higher frequencies really needs a smaller tuning capacity and is a matter of experiment.

Power Requirements

An HT supply of from 150 to 250 volts at about 2 mA, and 6·3 volts at about 0·3 amps., is required and can be tapped off the power supply of almost any piece of equipment. A power supply for such low loading can, of course, be easily built into the case of the Grid Dip Oscillator itself provided the mains transformer is not mounted too close to the EM84, as this might cause defects in the display due to distorting magnetic fields.



Inside the GDO discussed in the text, showing how the EM84 magic-eye valve is placed — see text.

BRITISH TV SHOULD CHANGE TO 625-LINE

The Television Advisory Committee expresses the view that the 405-line standard with 5 mc channel spacing now used in the U.K. will not be adequate for all purposes and that 625-line standards using 8 mc channel spacing would give a worthwhile improvement in picture quality. If this were decided upon, it would need to be phased over a number of years; the 405-line services would need to be continued for a long time so that there would be no question of 405-line receivers becoming prematurely obsolescent. With 8 mc channelling Bands I and III would give two 625-line programmes with 95 per cent population coverage, which might be increased to 98 per cent, and on the same basis Bands IV and V would give two programmes each with over 98 per cent coverage or three with about 95 per cent coverage.

United Kingdom television is now using Bands I and III. The report points out that it would be impracticable to adopt the 625-line standards if for any reason U.K. television is to be confined to Bands I and III only. In such circumstances, sufficient frequency space would be left in Band III to accommodate a third 405-line programme with at least 95 per cent population coverage.

Last Chance for Change

If more than three television programmes are envisaged for the future, Bands IV and V will have to be used, because there is no possibility of making more frequencies available for television in the VHF Bands I and III. The report finds, on the evidence of a large-scale field trial, that an acceptable television service could be provided in Bands IV and V.

The Committee says that if television is to be introduced into Bands IV and V (470-585 mc and 610-960 mc respectively), then this will be the last opportunity of changing to 625-line standards and in such circumstances recommends that this should be done.

Television in Bands IV and V would, however, be more expensive in terms of capital cost, since use of these Bands would need *four or five times* the number of transmitter stations required in Bands I and III to give comparable coverage. Sets capable of receiving all four television bands would also cost more.

Colour Television

The report finds that colour television is not yet ready for introduction. It recommends that a decision on future monochrome line standards should precede the start of a colour service and that, if 625-line standards are adopted, colour when introduced should use the new line standards.

PROGRESS

It is now possible to buy an automatic record player which will work in a car under mobile conditions—the idea is that on late-night journeys, when the last BC station has closed down, you can regale yourself with recorded music. The thing plays 7in. 45 r.p.m. records, feeds out through the car radio, and the design mechanically is such that the needle will stay on the record no matter how bumpy the road, or how sharp the turn.