

COSSOR 13 D.H.A.

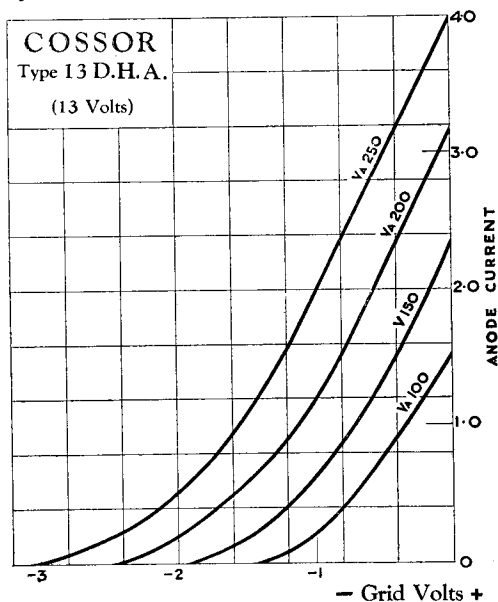
13-VOLT ·2 AMP. INDIRECTLY HEATED DOUBLE DIODE TRIODE

The Cossor 13 D.H.A. is an indirectly heated Double Diode Triode valve in the Cossor ·2 amp. series which may be used in A.C./D.C. or D.C. receivers where the heaters are run in series. This valve is intended for Automatic Volume Control and takes the form of a triode valve with two diodes all sharing the same cathode. The second diode makes it possible to apply delay when using this valve, the extent of which can be regulated as desired by a small negative potential applied to the controlling diode. Used in this way, the sensitivity of the set is not impaired, as A.V.C. will not come into play until the incoming signal reaches a value greater than the delay voltage.

It is to be noted that the Amplification Factor of the Triode portion of the 13 D.H.A. is very large, and the valve is therefore suited for sets in which the preceding H.F. or I.F. gain is only just adequate to provide satisfactory A.V.C.

TECHNICAL DATA

Heater Voltage (approx.)	.. .. .	13
Heater Current (Amps.)	.. .. .	·2
Maximum Anode Voltage	.. .. .	250
Impedance, at V_a 100, V_g 0	.. .. .	83,300 ohms
Mutual Conductance, at V_a 100, V_g 0	.. .. .	1·5 m.a./v.
Amplification Factor, at V_a 100, V_g 0	.. .. .	125



COSSOR 13 P.G.A.

13-VOLT ·2 AMP. INDIRECTLY HEATED PENTAGRID FREQUENCY CHANGER

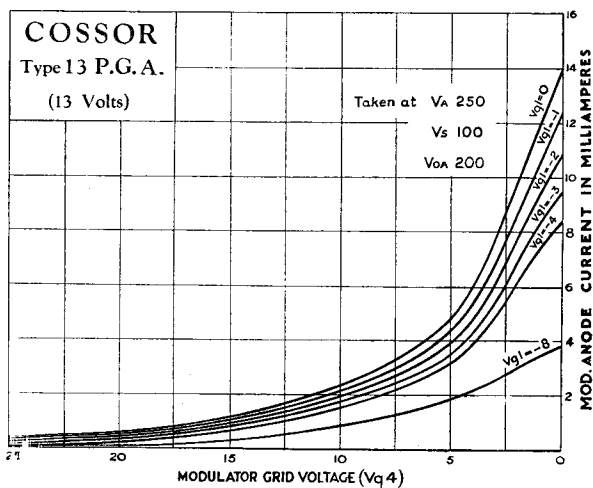
The Cossor 13 P.G.A. is an indirectly heated mains variable-mu Pentagrid valve and is one of the Cossor series with ·2 amp. heaters intended, among other uses, for series running in A.C./D.C. or D.C. receivers. It is used for frequency changing in a Superheterodyne receiver.

The Cossor Pentagrid provides what is, at the present time, the ideal single valve frequency changer, obviating the external coupling, in the two valve system, for injecting the oscillator output into the detector circuit.

The conversion conductance of the 13 P.G.A. is of such a value as to give satisfactory performance in any of the normal modern A.C./D.C. receivers. The value of this constant is not quite as high as that of the 4-volt, 1-amp. counterpart, 41 M.P.G., as the type of receiver for which the 13 P.G.A. is designed does not readily accommodate too high a value of conversion conductance. The Cossor 13 P.G.A. is distinguished by an inherent freedom from the whistles at various tuning points, that are unavoidable with certain other systems without extremely selective aerial tuning.

TECHNICAL DATA

Heater Voltage (approx.)	..	..	..	..	13
Heater Current (Amps.)	..	..	..	..	·2
Mod. Anode Voltage (Max.)	..	..	..	..	250
Mod. Screen Voltage (Max.)	..	..	..	..	100
Mod. Grid Voltage (Variable)	..	..	..	1·5 to	20
Osc. Anode Voltage (Max.)	..	..	..	..	200



COSSOR 13 S.P.A.

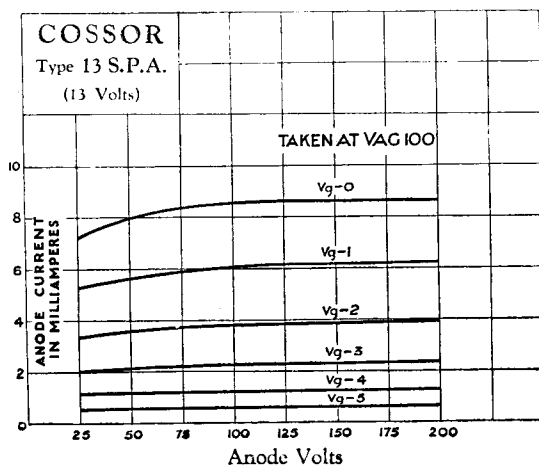
13-VOLT ·2 AMP. INDIRECTLY HEATED H.F. PENTODE

The Cossor 13 S.P.A. has a ·2 amp. heater and is designed for use with others of the series for series running, such as in A.C./D.C. or D.C. receivers. It is a high frequency pentode having general application in two directions: (a) as a high frequency amplifier, (b) as a detector of relatively high sensitivity.

The stage gain under normal conditions for the 13 S.P.A. is rather less than that given by a corresponding A.C. valve. This lower gain is deliberately introduced so that adequate stability can be attained in A.C./D.C. and certain other receivers, where perfect screening is rarely possible. Care should be taken, however, to ensure as good screening as possible, and for the same reason an anode decoupling resistance is usually desirable.

TECHNICAL DATA

Heater Voltage (approx.)	..	..	..	..	13
Heater Current (Amps.)	..	..	..	..	·2
Maximum Anode Voltage	..	..	..	..	200
Maximum Auxiliary Grid Voltage	..	..	..	..	100
Mutual Conductance at Va. 200, Vag. 100,					
Vg. — 0	..	..	..	..	2·5 m.a./v.



COSSOR 13 V.P.A.

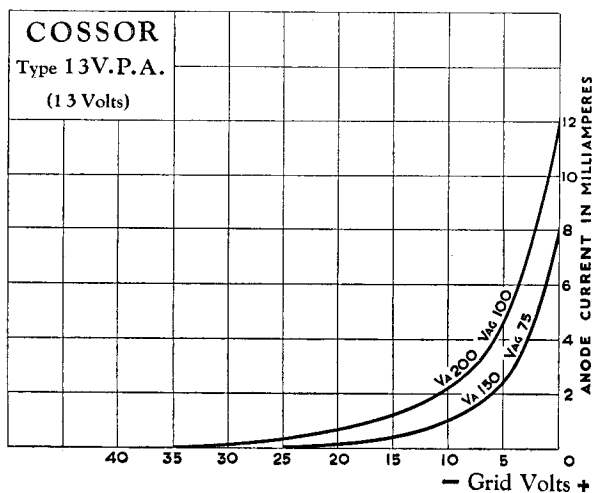
13-VOLT ·2 AMP. INDIRECTLY HEATED VARIABLE MU H.F. PENTODE

The Cossor 13 V.P.A. is a variable-mu high frequency screened pentode. It is particularly useful as a high frequency or intermediate frequency amplifier. Its variable-mu characteristic permits of manual volume control by means of variation of grid bias or of the application of automatic volume control.

The suppressor grid is brought out to a separate pin in the seven-pin base type, which makes possible the use of the valve in various special ways, such as for frequency changing. In addition, negative potential applied to this grid will greatly decrease the impedance—a function that may be used in special sets for simultaneously decreasing the gain and flattening the tuning, permitting the most perfect quality from the local station. The valve is also available with five-pin base, where the suppressor grid is connected to cathode.

TECHNICAL DATA

Heater Voltage (approx)	..	..	..	..	13
Heater Current (Amps.)	..	..	..	..	·2
Maximum Anode Voltage	..	..	..	..	200
Maximum Auxiliary Grid Voltage	..	..	..	..	100
Mutual Conductance at Va. 200, Vag. 100, Vg. 0	..	..	..	..	1·8 m.a./v.
Grid Voltage (Variable)	..	..	..	..	0 to — 30



COSSOR 210 DET.

2-VOLT SPECIAL DETECTOR

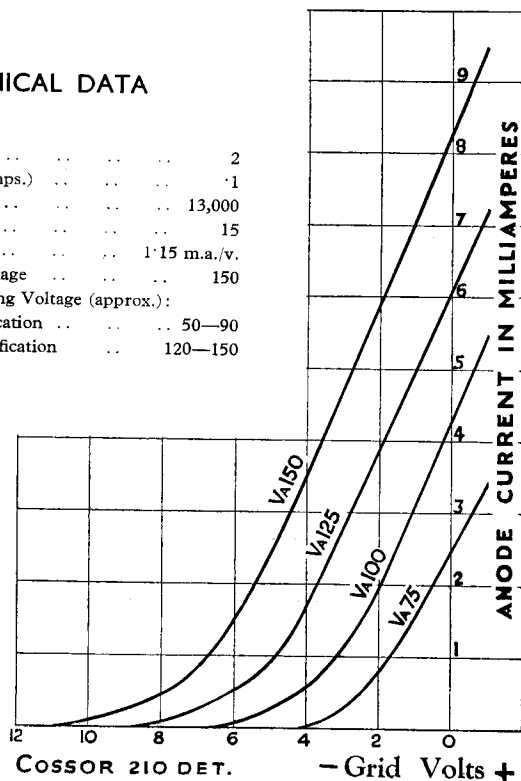
The 210 DET. has been specially designed for those battery sets in which it is essential that the detector will accept a fairly large signal before overload commences. It will be noted that its impedance at the conventional V_a 100, V_g 0, is 13,000 ohms, somewhat lower than the usual 20,000—25,000 ohms.

The valve is fitted with all precautions against microphonic noise and will be found to be a good general purpose detector valve. In addition it is suitable for use as a small L.F. amplifier.

TECHNICAL DATA

For Detector Stage.

Filament Voltage	2
Filament Current (Amps.)	.1
Impedance (ohms)	13,000
Amplification Factor	15
Mutual Conductance	1.15 m.a./v.
Maximum Anode Voltage	150
Normal Anode Working Voltage (approx.):	
Grid Leak Rectification	50—90
Anode Bend Rectification	120—150



COSSOR 210 H.F.

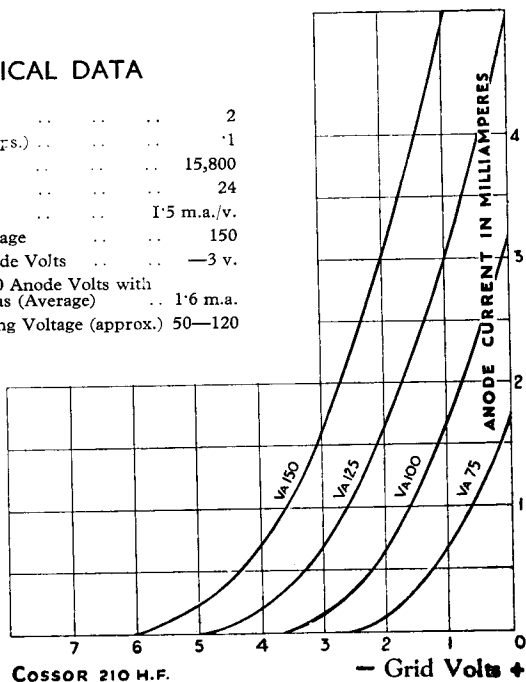
2-VOLT TRIODE

This valve is very similar to the 210 H.L. with the exception that the mutual conductance is somewhat higher. In consequence its sensitivity is somewhat greater, a quality which may be of advantage in sets with only moderate H.F. gain.

As in the case of the 210 H.L., special precautions have been taken to ensure that no microphonic noise is present.

TECHNICAL DATA

Filament Voltage	2
Filament Current (Amperes)	1
Impedance (ohms)	15,800
Amplification Factor	24
Mutual Conductance	1.5 m.a./v.
Maximum Anode Voltage	150
Grid Bias for 150 Anode Volts	-3 v.
Anode Current for 150 Anode Volts with -3 volts Grid Bias (Average)	1.6 m.a.
Normal Anode Working Voltage (approx.)	50—120



COSSOR 210 H.L.

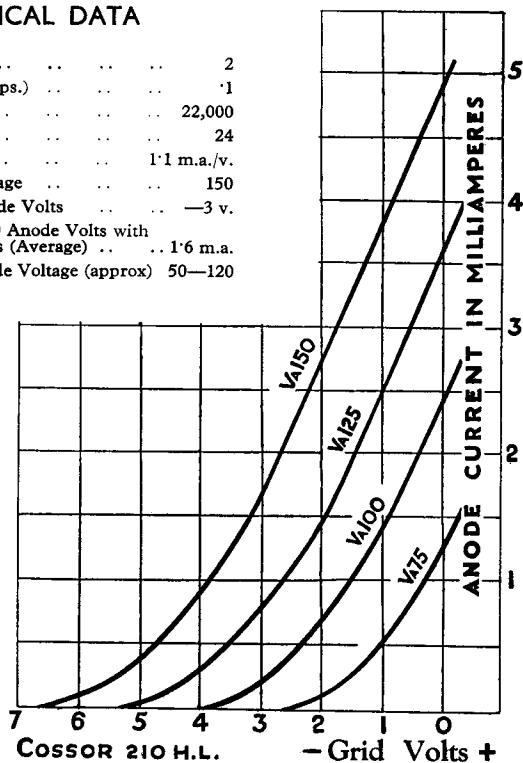
2-VOLT TRIODE

This valve is probably the most popular Cossor valve in the battery series for use in the detector stage. Its characteristics are such as to suit it for use as a leaky grid detector in combination with small L.F. transformers. Under these conditions sufficient output is obtained to load a small output pentode or triode before overload occurs. In addition, the anode consumption is small, a consideration in receivers using H.T. batteries.

The valve, in common with most other Cossor battery valves for use as H.F. or I.F. amplifiers, or as detectors, is fitted with seven point filament suspension. No microphony need therefore be feared as filament vibration is completely damped.

TECHNICAL DATA

Filament Voltage	.. .. .	2
Filament Current (Amps.)	.. .. .	.1
Impedance (ohms)	.. .. .	22,000
Amplification Factor	.. .. .	24
Mutual Conductance	.. .. .	1.1 m.a./v.
Maximum Anode Voltage	.. .. .	150
Grid Bias for 150 Anode Volts	.. .. .	-3 v.
Anode Current for 150 Anode Volts with -3 volts Grid Bias (Average)	.. .. .	1.6 m.a.
Normal Working Anode Voltage (approx)		50-120



COSSOR 210 L.F.

2-VOLT TRIODE

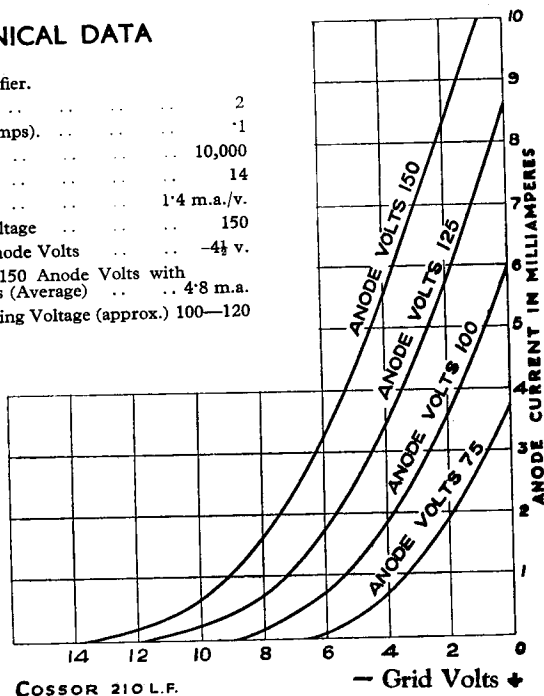
This valve is primarily intended for use in the first low frequency stage, but it has many other useful applications. The 210 L.F. is recommended as being a useful valve as the driver for a Class "B" Stage in combination with the 220 B.

Full output from the Class "B" valve must not be expected when the 210 L.F. is used as a driver, but the highest economy in anode current is obtained, combined with adequate volume for all domestic purposes.

TECHNICAL DATA

For First L.F. Amplifier.

Filament Voltage	2
Filament Current (Amps). .. .	1
Impedance (ohms)	10,000
Amplification Factor	14
Mutual Conductance	1.4 m.a./v.
Maximum Anode Voltage	150
Grid Bias for 150 Anode Volts	-4½ v.
Anode Current for 150 Anode Volts with -4½ volts Grid Bias (Average)	4.8 m.a.
Normal Anode Working Voltage (approx.)	100—120



COSSOR 210 P.G.

2-VOLT PENTAGRID

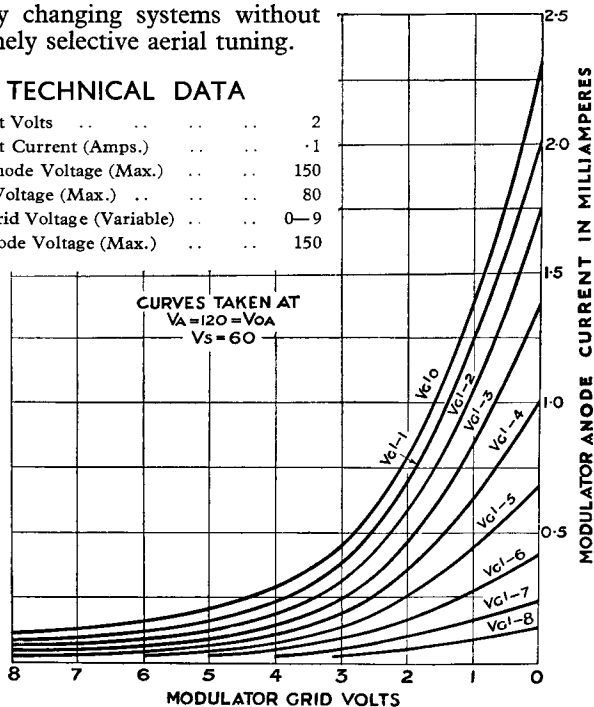
The Cossor 210 P.G. is a 2-volt battery variable-mu pentagrid valve requiring only $\cdot 1$ amp. for filament heating. The valve consists of five grids in addition to the usual filament and anode. It is designed for use as a frequency changer in a superheterodyne receiver.

It provides a very convenient solution to the problem of frequency changing in battery sets. No external coupling is necessary for injecting the oscillator input into the detector circuit and, in addition, the valve can be controlled in an automatic volume control receiver. The filament and anode current consumptions have been kept as low as possible, but in spite of this, the conversion conductance of the valve is of a high order, so that the 210 P.G. is exceptionally efficient.

The valve's inherent freedom from oscillator harmonics gives freedom from the whistles which occur at certain tuning points, unavoidable with certain other frequency changing systems without extremely selective aerial tuning.

TECHNICAL DATA

Filament Volts	..	..	..	..	2
Filament Current (Amps.)	..	..	..	..	$\cdot 1$
Mod. Anode Voltage (Max.)	..	..	..	..	150
Screen Voltage (Max.)	..	..	..	..	80
Mod. Grid Voltage (Variable)	..	..	..	..	0-9
Osc. Anode Voltage (Max.)	..	..	..	..	150



COSSOR 210 R.C.

2-VOLT TRIODE

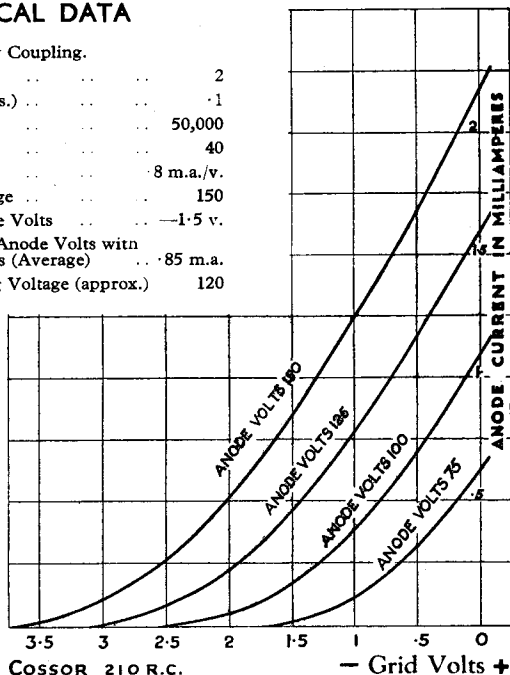
Essentially a valve of very high impedance, the 210 R.C. is somewhat restricted in its application. It has, however, a wide application as a replacement in sets designed a year or two ago, where valves of very high impedance were very popular in the detector stage.

The high amplification factor makes this valve very suitable for use where the input is rather small. If followed by a transformer, which must have a very high primary impedance, the overall stage gain is high. When the input to the detector is relatively large, the 210 H.L. is preferable.

TECHNICAL DATA

For Resistance Capacity Coupling.

Filament Voltage	2
Filament Current (Amps.)	.1
Impedance (ohms)	50,000
Amplification Factor	40
Mutual Conductance	8 m.a./v.
Maximum Anode Voltage	150
Grid Bias for 150 Anode Volts	-1.5 v.
Anode Current for 150 Anode Volts with -1.5 volt Grid Bias (Average)	85 m.a.
Normal Anode Working Voltage (approx.)	120



COSSOR 210 S.P.T.

2-VOLT H.F. PENTODE

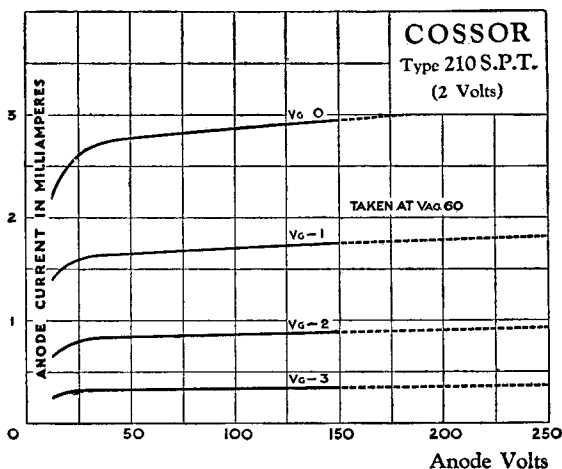
This high frequency pentode has a normal anode-current grid-voltage curve without the so called variable-mu characteristic. In consequence, when used as an H.F. amplifier, it should be used only in the first position in the set where the signal voltage is small.

The Cossor 210 S.P.T. is an extremely brilliant detector valve, and may be used as a leaky grid detector when transformer coupled, which will result in a very large gain in the detector stage, or it may be used as anode bend detector followed by resistance coupling, where the gain will be slightly larger than a triode valve used with transformer coupling.

This method is, however, to be avoided when smooth reaction is required, as it is almost impossible of attainment when using such a valve working at anode bend. Perfectly smooth reaction is, of course, obtainable when using this valve as a leaky grid detector.

TECHNICAL DATA

Filament Voltage	2
Filament Current (Amps.)	1
Mutual Conductance	1.3 m.a./v.
Maximum Anode Voltage	150
Maximum Auxiliary Grid Voltage	80
Anode Current for 150 Anode Volts, 0 grid bias	3 m.a.
Anode Current for 150 Anode Volts and — 1.5 volts grid bias	2 m.a.



COSSOR 210 V.P.T.

2-VOLT VARIABLE MU H.F. PENTODE

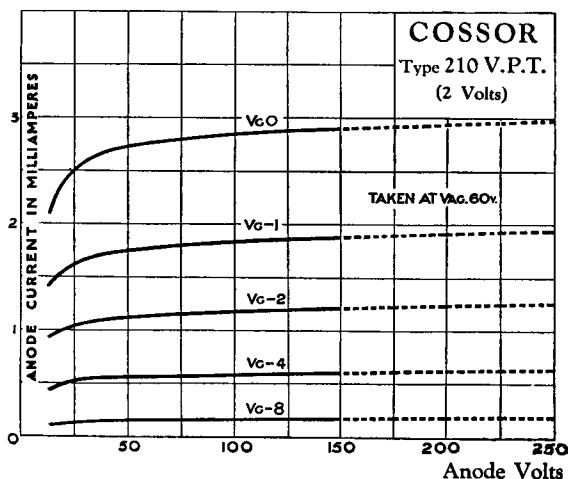
The Cossor 210 V.P.T. is a variable-mu screened grid H.F. pentode, and represents the latest advance in the design of H.F. amplifier valves.

It differs from the ordinary screened grid valve inasmuch as there is an extra grid interposed between screening grid and anode, which so modifies the characteristics of the valve that it can deliver a larger output, without risk of rectification, than that available from the ordinary variable-mu screened grid.

The valve is suited for use as an H.F. amplifier or as an I.F. amplifier in battery superheterodyne receivers. Its variable-mu characteristic allows automatic volume control to be applied.

TECHNICAL DATA

Filament Voltage	2
Filament Current (Amps.)	1
Mutual Conductance	1.1 m.a./v.
Maximum Anode Voltage	150
Maximum Auxiliary Grid Voltage	80
Grid Bias Voltage (Variable)	0 to — 9
Anode Current for 150 Anode Volts and 0 grid bias	2.9 m.a.
Anode Current for 150 Anode Volts with — 1.5 volts grid bias	1.5 m.a.



COSSOR 215 P.

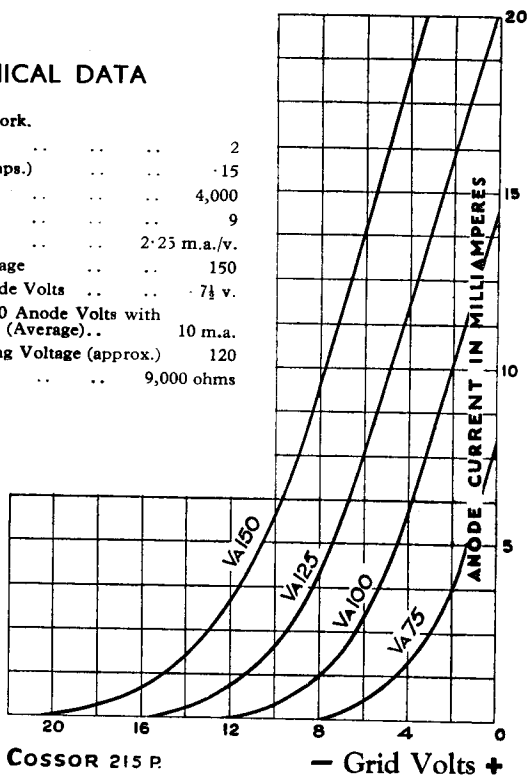
2-VOLT POWER VALVE

The Cossor 215 P. is a power valve designed for use in the output stage of receivers operating with high resistance speakers of the reed or balanced armature type. Under these conditions, it will provide good volume for an H.T. consumption of 6—10 m./a. Choke filter output is unnecessary under these conditions. When used with medium or low resistance speakers, a condenser having a value between .002 and .01 mfd. should be connected between the anode of the valve and H.T. — in order to maintain an even frequency response.

TECHNICAL DATA

For Normal Power Work.

Filament Voltage	2
Filament Current (Amps.)	.15
Impedance (ohms)	4,000
Amplification Factor	9
Mutual Conductance	2.25 m.a./v.
Maximum Anode Voltage	150
Grid Bias for 150 Anode Volts	$-7\frac{1}{2}$ v.
Anode Current for 150 Anode Volts with $-7\frac{1}{2}$ volts Grid Bias (Average)	10 m.a.
Normal Anode Working Voltage (approx.)	120
Optimum Load	9,000 ohms



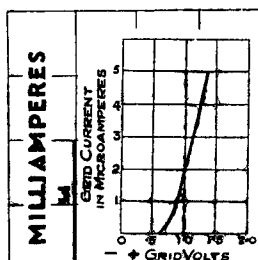
COSSOR 215 S.G.

2-VOLT SCREENED GRID

This valve is a screened grid tetrode valve and was manufactured before the introduction of variable-mu valves. It has been used in enormous numbers of portable and other battery receivers with conspicuous success. It develops its maximum efficiency when followed by a coupling of high dynamic resistance which possesses no step up.

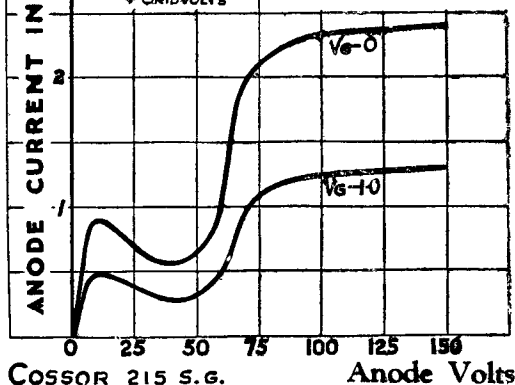
Special attention is drawn to the unique grid current characteristic. No current flows in the grid circuit with zero applied voltage. This valve may therefore be used without grid bias and the full rated mutual conductance is realised in practice. In spite of the exceptional stage gain thus developed, the valve is inherently stable owing to the very low inter-electrode capacity of the order of $\cdot 001$ micro-microfarads.

TECHNICAL DATA



For Super H.F. Amplification.

Filament Voltage	2
Filament Current (Amps.)	$\cdot 15$
Impedance (ohms)	300,000
Amplification Factor	330
Mutual Conductance	$1\cdot 1$ m.a./v.
Maximum Anode Voltage	150
Grid Bias for economy of H.T. current	$-1\cdot 5$ v.
Anode Current for 150 Anode Volts with $-1\cdot 5$ volt Grid Bias (Average)	$\cdot 7$ m.a.
Normal Working Anode Voltage	120
Positive Voltage on Screen Grid	60-80 v.



COSSOR 220 B.

2-VOLT CLASS B

The 220 B. is very similar to the 240 B., but has a lower filament consumption and somewhat smaller output. When filament consumption is a consideration, this valve should be chosen unless very great volume is required. The 220 B. will give volume somewhere about 8 times that available from a standard power valve, while consuming less H.T. current. The 215 P. will be found convenient as a driver, although the 210 L.F. may be used.

TECHNICAL DATA

Filament Volts	..	..	..	..	2.0
Filament Amps. (Total)	..	..	..	..	.2
Anode Volts (Normal)	..	..	..	..	120
Max. Anode Current Swing	..	..	..	..	35 m.a.
Max. Peak Applied Signal (Grid to Grid)	..	..	..	..	40 v.

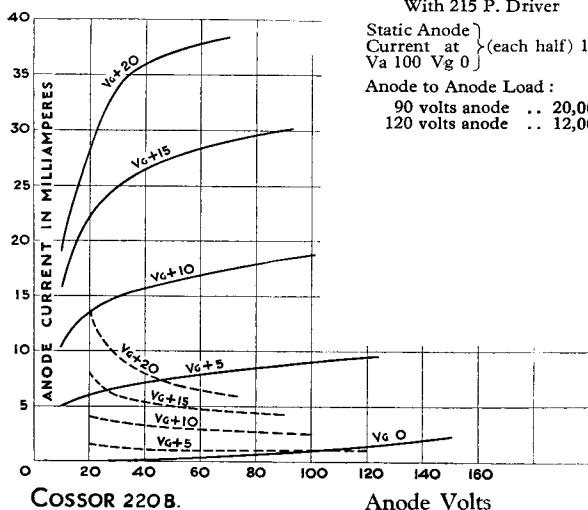
Average Anode Current when working with 120 volts on anode:

Without Driver	..	6 m.a.
With 215 P. Driver	..	7.5 m.a.

Static Anode Current at $V_a 100 V_g 0$ } (each half) 1.25 m.a.

Anode to Anode Load:

90 volts anode	..	20,000 ohms
120 volts anode	..	12,000 ohms



COSSOR 220 D.D.

2-VOLT DOUBLE DIODE

The 220 D.D. is a valve designed primarily for use in sets in which automatic volume control is to be provided and is the only battery indirectly heated valve made. It consists of two diodes, one of which is intended for detection of the signal, while the other provides the voltage necessary for A.V.C. These derive their electron current from the same cathode. The 220 D.D. in many cases should be followed by a stage of L.F. amplification which precedes the output valve ; for this purpose the user has a wide choice of valves (e.g. triode, variable-mu screened pentode, etc.) to suit the particular conditions imposed by the output valve. If the diode is used in combination with the high sensitivity Cossor output pentode 220 H.P.T., however, the L.F. stage may be dispensed with and the 220 H.P.T. may be fed directly from the diode. This method is particularly recommended. By using one of the diodes to provide the A.V.C. voltage, it becomes possible to prevent the A.V.C. System from coming into operation unless the signal would overload the output valve in its absence. In this way the sensitivity of the receiver is in no way impaired by adding automatic volume control to it. Such a system, in which A.V.C. only comes into use on a signal exceeding some pre-arranged strength, is called "delayed A.V.C."

In the 220 D.D., voltage delay is arranged by a small positive voltage on the cathode obtained from a high resistance potentiometer across the H.T. supply. No current will flow until the peak voltage of the signal exceeds the delay voltage, after which rectification will take place in the normal way, providing a D.C. voltage change which can be passed back to the grids of the preceding variable-mu amplifier valves to control the sensitivity of the set. The return circuit for the signal diode is made to cathode so that it is not affected by the delay voltage.

It is to be noted that no useful purpose is served in fitting automatic volume control to sets with inadequate H.F. gain as no L.F. overloading will occur in these cases.

COSSOR 220 H.P.T.

2-VOLT ECONOMY PENTODE

The 220 H.P.T. is a pentode valve that will give a generous output for a very small value of high tension current.

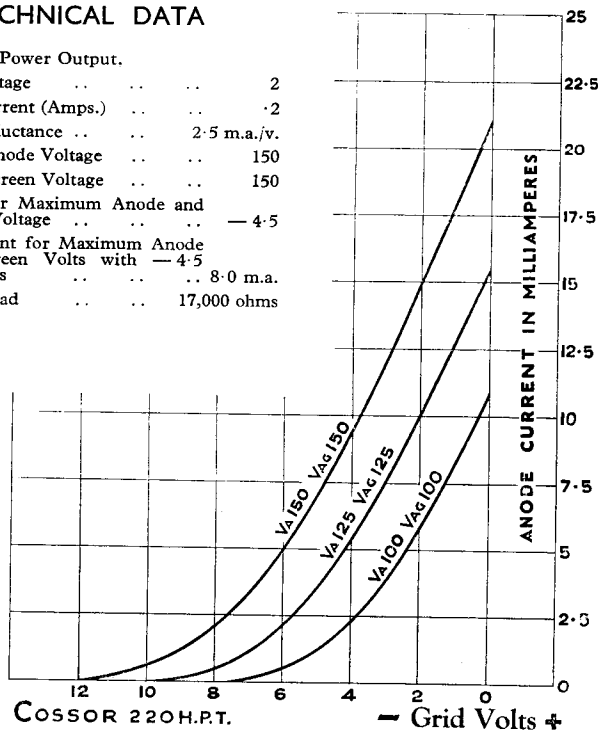
The sensitivity of the valve is of a high order, and it is therefore particularly suitable for use when the input is small.

By a suitable adjustment of screen and grid bias voltages, this valve may be adjusted to work with very small anode current. Even when the anode current is cut down as low as 4 m.a., the undistorted output available is much greater than that obtainable from an ordinary power valve consuming twice as much current. This is due to the high efficiency of a correctly designed pentode.

TECHNICAL DATA

For Pentode Power Output.

Filament Voltage	.. .. .	2
Filament Current (Amps.)	.. .. .	0.2
Mutual Conductance	.. .. .	2.5 m.a./v.
Maximum Anode Voltage	.. .. .	150
Maximum Screen Voltage	.. .. .	150
Grid Bias for Maximum Anode and Screen Voltage	.. .. .	-4.5
Anode Current for Maximum Anode and Screen Volts with -4.5 volts bias	.. .. .	8.0 m.a.
Optimum Load	.. .. .	17,000 ohms



COSSOR 220 P.

2-VOLT POWER VALVE

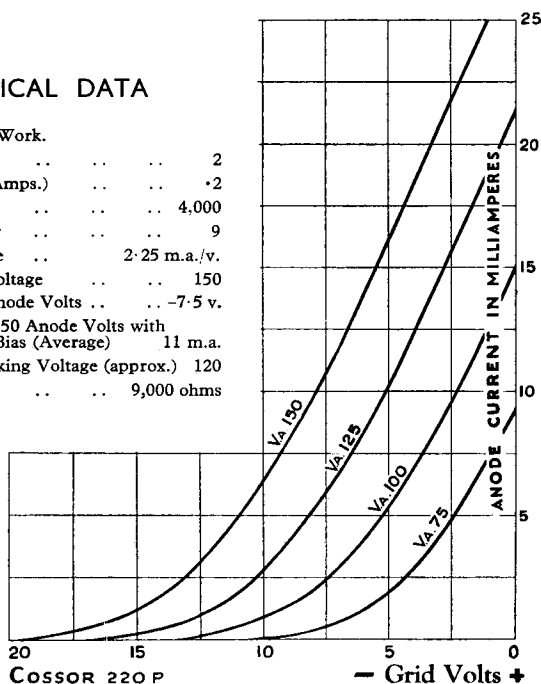
The 220 P. is a valve very similar to the 215 P. with the exception that its dynamic curve shows a mutual conductance slightly better maintained than in the 215 P., consequently the efficiency is a little improved.

The valve may be used as an output valve with reed or balanced armature speakers, or as the driver in a Class "B" stage in combination with the 220 B or 240 B. Full volume may be obtained from both these valves using the 220 P. as a driver.

TECHNICAL DATA

For Normal Power Work.

Filament Voltage	..	..	2
Filament Current (Amps.)	..	..	.2
Impedance (ohms)	..	..	4,000
Amplification Factor	..	..	9
Mutual Conductance	..	2.25 m.a./v.	
Maximum Anode Voltage	..	..	150
Grid Bias for 150 Anode Volts	..	..	-7.5 v.
Anode Current for 150 Anode Volts with -7.5 volts Grid Bias (Average)	..	..	11 m.a.
Normal Anode Working Voltage (approx.)	..	..	120
Optimum Load	..	..	9,000 ohms



COSSOR 220 P.A.

2-VOLT HIGH SLOPE POWER VALVE

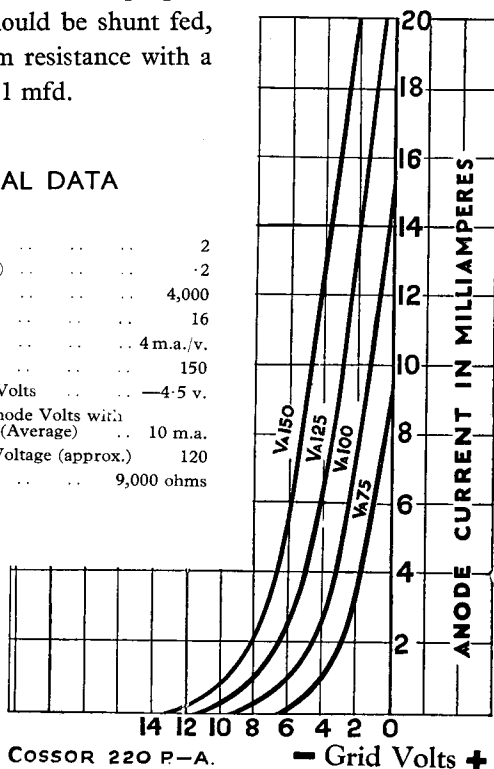
This valve develops approximately the same A.C. output as the 220 P. It is, however, much more sensitive owing to its high value of mutual conductance. It should be used when full volume is not attained with a 220 P. due to low sensitivity.

Attention is drawn to the fact that the 220 P.A. is very strongly recommended as the best battery valve for both power-grid and anode-bend detection when adequate anode current and voltage are available. For the former purpose the transformer should be shunt fed, using a 15,000 ohm resistance with a condenser of .5 to 1 mfd.

TECHNICAL DATA

For Normal Power Work.

Filament Voltage	2
Filament Current (Amps.)	.2
Impedance (ohms)	4,000
Amplification Factor	16
Mutual Conductance	4 m.a./v.
Maximum Anode Voltage	150
Grid Bias for 150 Anode Volts	-4.5 v.
Anode Current for 150 Anode Volts with -4.5 volts Grid Bias (Average)	10 m.a.
Normal Anode Working Voltage (approx.)	120
Optimum Load	9,000 ohms



COSSOR 220 P.T.

2-VOLT POWER PENTODE

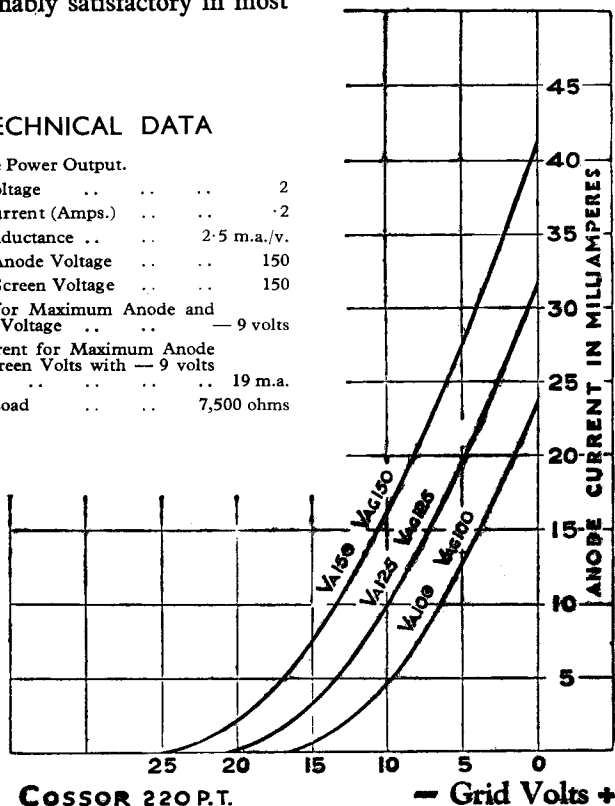
The 220 P.T. has an exceptionally high value of undistorted output, and is therefore very suitable for using with a moving-coil loud speaker. Care should be taken to match correctly the speaker to the valve if the former is not specially designed for use with a pentode valve.

To obtain the full advantage of a pentode valve with the average moving-iron loud speaker a "Corrector Circuit" should be used. This circuit is very simple, consisting only of a condenser of 0.01 mfd. and resistance of 10,000 ohms, joined in series across the speaker terminals. The exact values cannot be prescribed, because they depend on the make of loud speaker; those given are reasonably satisfactory in most cases.

TECHNICAL DATA

For Pentode Power Output.

Filament Voltage	2
Filament Current (Amps.)	0.2
Mutual Conductance	2.5 m.a./v.
Maximum Anode Voltage	150
Maximum Screen Voltage	150
Grid Bias for Maximum Anode and Screen Voltage	— 9 volts
Anode Current for Maximum Anode and Screen Volts with — 9 volts bias	19 m.a.
Optimum Load	7,500 ohms



COSSOR 220 S.G.

2-VOLT SCREENED GRID

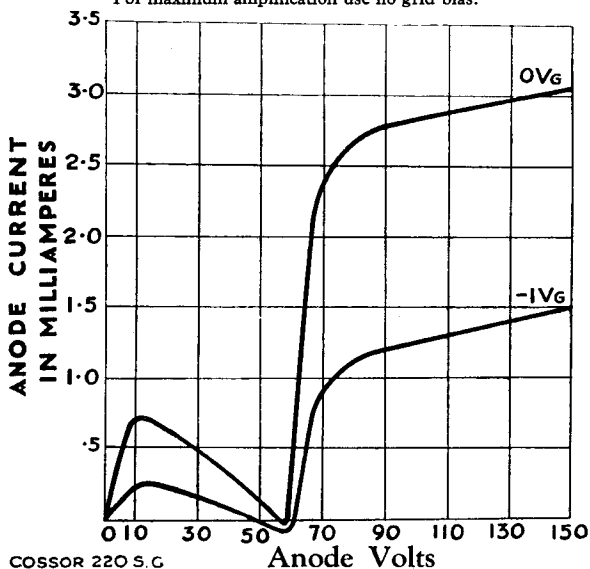
The 220 S.G. is a very similar valve to the 215 S.G. but has a somewhat lower impedance and a higher mutual conductance. When used in conjunction with ordinary commercial coils, screened grid valves develop a gain which is proportional, in almost all cases, to the mutual conductance. Hence this valve is used in preference to the 215 S.G. where enhanced sensitivity is required. The same limitation applies to this valve and the 215 S.G. as to the 210 S.P.T. in that the signal handling capacity is limited owing to the straight characteristics. As a detector valve, however, it very definitely has its uses and, in addition, has many special laboratory uses. In particular it is very suitable as a dynatron oscillator in wave meters.

TECHNICAL DATA

For Super H.F. Amplification.

Filament Voltage	.. .. .	2
Filament Current (Amps.)	.. .. .	.2
Impedance (ohms)	.. .. .	200,000
Amplification Factor	.. .. .	320
Mutual Conductance	.. .. .	1.6 m.a./v.
Inter-electrode capacity of the order of	.. .. .	.001 $\mu\mu\text{F}$.
Maximum Anode Voltage	.. .. .	150
Grid Bias for economy of H.T. current*	.. .. .	-1.5 v.
Anode Current ($V_a = 150$) grid return to L.T.~	.. .. .	3.1 m.a.
Anode Current ($V_a = 150$) -1.5 volt Grid Bias	.. .. .	.7 m.a.
Normal Working Anode Voltage	.. .. .	120
Positive Voltage on Screened Grid	.. .. .	60-80

*For maximum amplification use no grid bias.



COSSOR 220 V.S.

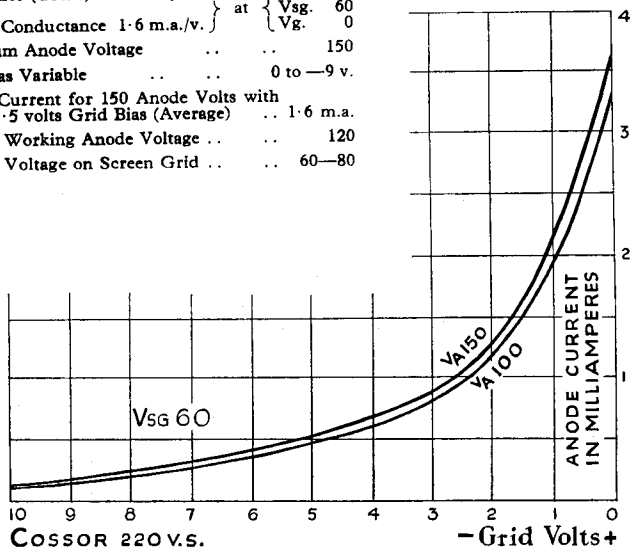
2-VOLT VARIABLE MU. S.G.

This valve is a screened grid tetrode of the variable-mu type and has a relatively short grid base. For this reason it requires only a 9-volt grid bias battery to give adequate control of stage gain. By virtue of its characteristics this valve has a low high-tension consumption, and is capable of very high stage gain when associated with suitable coils. Like other Cossor screened grid valves, it has a very low grid-anode capacity of the order of .001 micro-microfarads.

TECHNICAL DATA

For Super H.F. Amplification.

Filament Voltage	2
Filament Current (Amps.)	.2
Impedance (Ohms) .. 400,000	at { Va. 150
	{ V _{sg} . 60
	{ V _g . 0
Mutual Conductance 1.6 m.a./v. }	
Maximum Anode Voltage	150
Grid Bias Variable	0 to -9 v.
Anode Current for 150 Anode Volts with -1.5 volts Grid Bias (Average)	1.6 m.a.
Normal Working Anode Voltage	120
Positive Voltage on Screen Grid	60-80



COSSOR 220 V.S.G.

2-VOLT VARIABLE MU S.G.

This is a variable-mu screened grid valve, and was the first of its type to be introduced by Cossor. It differs from the 220 V.S. in that its grid base is considerably longer. Where an 18 volt grid battery can be fitted to a set, variable bias on the grid of this valve gives a very efficient and gradual form of manual volume control.

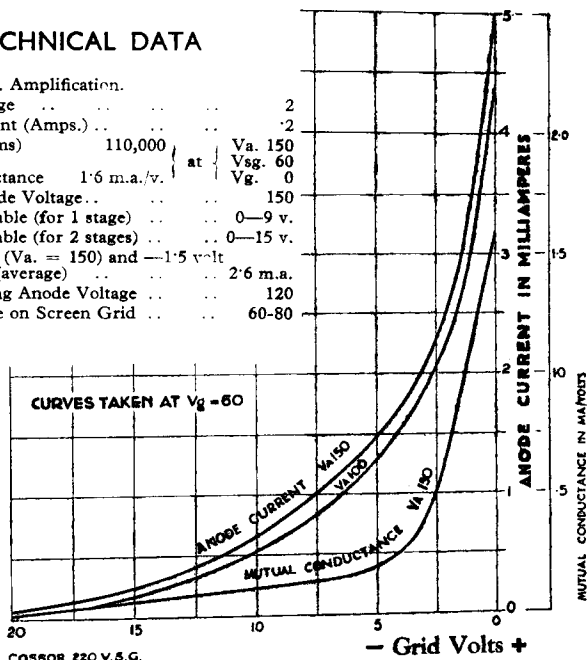
In a multi-stage receiver, the form of its variable-mu characteristic is such as to reduce cross modulation very considerably owing to the lack of any abrupt changes in its slope.

The inter-electrode capacity is the same as that of the 215 S.G. and 220 S.G., viz. .001 micro-microfarads. A very high stage gain is obtained which will, of course, be decreased as bias is increased, thus providing the set with a perfect volume control capable of enormous variation.

TECHNICAL DATA

For Super H.F. Amplification.

Filament Voltage	2
Filament Current (Amps.) .. .	.2
Impedance (ohms) 110,000	at
	Va. 150
	Vsg. 60
	Vg. 0
Mutual Conductance 1.6 m.a./v.	
Maximum Anode Voltage .. .	150
Grid Bias Variable (for 1 stage) .. .	0—9 v.
Grid Bias Variable (for 2 stages) .. .	0—15 v.
Anode Current (Va. = 150) and —1.5 volt	
Grid Bias (average) .. .	2.6 m.a.
Normal Working Anode Voltage .. .	120
Positive Voltage on Screen Grid .. .	60-80



COSSOR 220 V.S.G.

COSSOR 230 X.P.

2-VOLT SUPER POWER

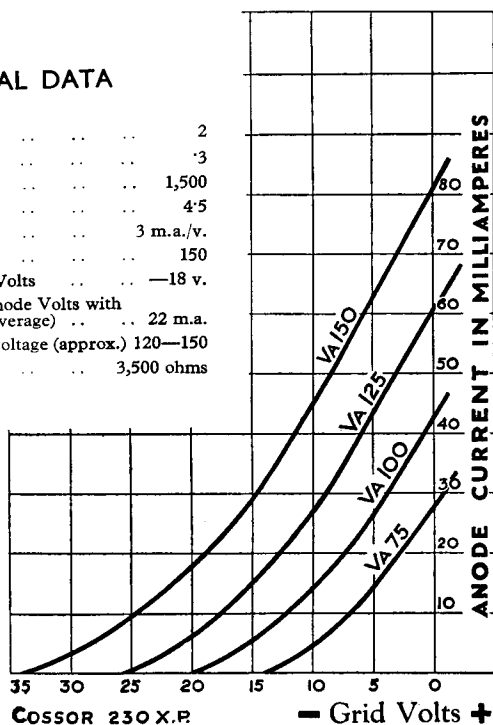
The 230 X.P. is a super-power valve, and has the lowest impedance and highest undistorted output of its class. It has a high standing anode current and requires a large signal voltage. In consequence, its main use is found in receivers or amplifiers using H.T. eliminators and which have a preceding L.F. amplifier. The volume and quality of the reproduction under these conditions is, however, extremely good. The valve may be used with a small moving coil permanent magnet speaker.

Two 230 X.P. valves may be used with advantage in a push-pull stage when considerably greater volume can be obtained than with two valves in parallel.

TECHNICAL DATA

For Extra Power Use.

Filament Voltage	..	..	..	..	2
Filament Current (Amps)	..	..	..	..	.3
Impedance (ohms.)	..	..	..	..	1,500
Amplification Factor	..	..	..	..	4.5
Mutual Conductance	..	..	..	..	3 m.a./v.
Maximum Anode Voltage	..	..	..	..	150
Grid Bias for 150 Anode Volts	..	..	..	..	-18 v.
Anode Current for 150 Anode Volts with -18 volts Grid Bias (Average)	..	..	..	..	22 m.a.
Normal Working Anode Voltage (approx.)	120—150				
Optimum Load	..	..	..	..	3,500 ohms



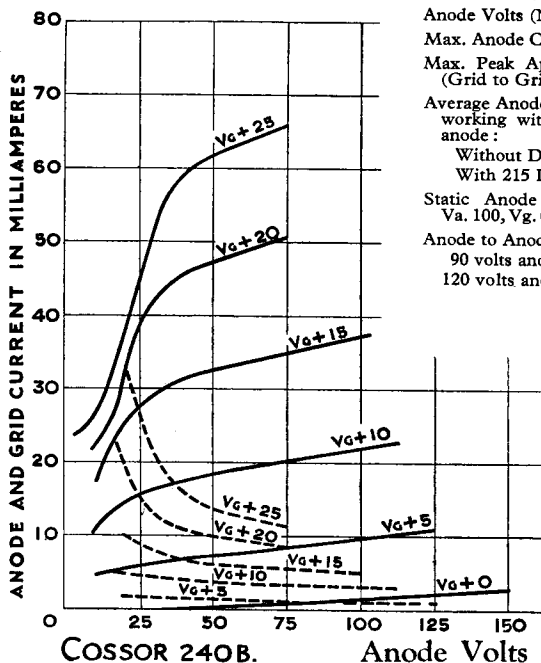
COSSOR 240 B

2-VOLT CLASS B

The Cossor 240 B. is a special valve comprising two separate triodes in one bulb for use in the output stage of a receiver. When used with a driver valve in the manner described on page 33, it is capable of giving very large output for small average High Tension consumption, the reason being that this special form of output, Class B, draws only sufficient current for the actual work to be done at any instant, and practically nothing during programme intervals.

TECHNICAL DATA.

Filament Volts	2.0
Filament Amps. (Total)	.4
Anode Volts (Normal)	120
Max. Anode Current Swing	50 m.a.
Max. Peak Applied Signal (Grid to Grid)	40 v.
Average Anode Current when working with 120 volts on anode:	
Without Driver	8.5 m.a.
With 215 P. Driver	11 m.a.
Static Anode Current at Va. 100, Vg. 0 (each half)	1.5 m.a.
Anode to Anode Load:	
90 volts anode	10,000 ohms
120 volts anode	8,000 ohms



COSSOR

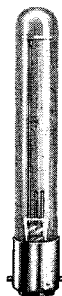
Neon Tuning Indicators

Catalogue Nos. 3180 and 3184

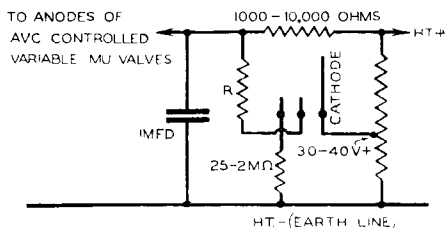
The Cossor 3-electrode Neon Tuning Indicator consists of three electrodes—two short and the other long—in an atmosphere of neon.

It may be used in an A.V.C. receiver, where it gives, in the form of a glow spreading up the cathode (long electrode), a visual indication of the correct tuning point, which point is indicated by the maximum height and intensity of the glow.

It is actuated by the rise and fall of the anode currents of A.V.C. controlled variable-mu



*The Cossor Neon
Tuning Indicator
Type 3180.*



valves. In use, a steady voltage of 145-160 is required to maintain the striking of the tube, and this will rise when the receiver is correctly tuned.

COSSOR NEON TUBE

VOLTAGE STABILIZER. S.130

The S.130 is a 2-electrode gas-filled tube, adjusted so that a voltage placed across the electrodes causes a discharge through the gas.

It is designed to be placed across the output of any eliminator capable of an output of approximately 130 volts that is required to provide a voltage that does not change appreciably when the current drawn is varied within wide limits. Its chief application is to stabilize the voltage from an eliminator used with a receiver employing a Cossor Class B Output Valve or a Quiescent Push-Pull Output Stage, as both these systems draw an anode current varying widely with the loudness of received signals.

COSSOR 402 P.

40-VOLT ·2 AMP. INDIRECTLY HEATED TRIODE

The Cossor 402 P. is an indirectly heated output Triode of the super power class, designed for series running as in A.C./D.C. receivers. In common with others of the same Cossor range it requires a heater current of ·2 amp., the approximate heater voltage being 40 volts.

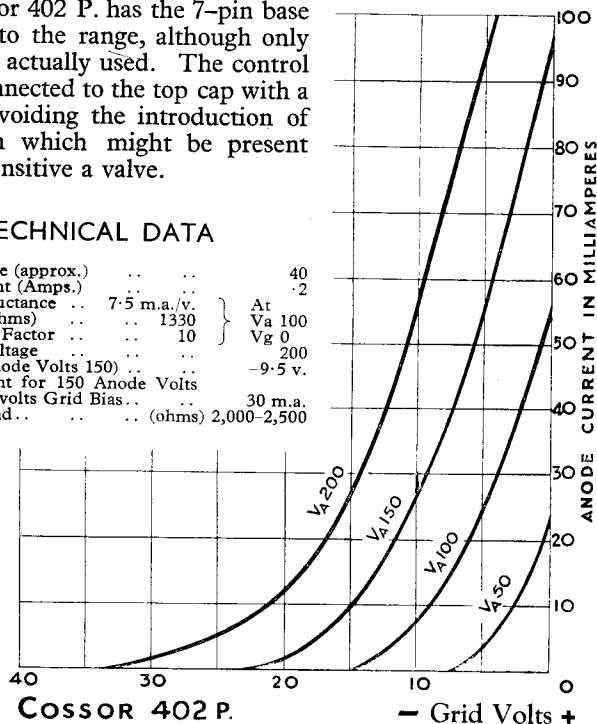
The valve is designed for a maximum anode voltage of 200 volts since, in general, no greater voltage can be obtained in the type of receiver for which it is intended, but for other applications this voltage must not be exceeded, while the maximum anode dissipation is 8 watts.

In many circumstances the anode voltage will be of the order of 150 volts and under these conditions the undistorted output available is adequate for domestic purposes.

The Cossor 402 P. has the 7-pin base standard to the range, although only 4-pins are actually used. The control grid is connected to the top cap with a view to avoiding the introduction of A.C. hum which might be present with so sensitive a valve.

TECHNICAL DATA

Heater Voltage (approx.)	.. ..	40	
Heater Current (Amps.)	.. ..	·2	
Mutual Conductance	.. 7·5 m.a./v.		At
Impedance (ohms)	 1330		Va 100
Amplification Factor	 10		Vg 0
Maximum Voltage	.. ..	200	
Grid Bias (Anode Volts 150)	.. ..	-9·5 v.	
Anode Current for 150 Anode Volts	.. ..	30 m.a.	
and -9·5 volts Grid Bias	.. ..		
Optimum Load	 (ohms)	2,000-2,500	



COSSOR 40 P.P.A.

40-VOLT ·2 AMP. INDIRECTLY HEATED OUTPUT PENTODE

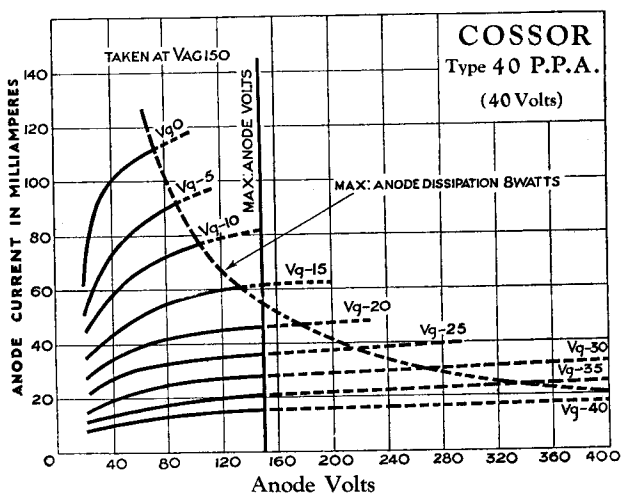
The Cossor 40 P.P.A. is a L.F. pentode valve of the indirectly heated cathode type and its undistorted output is adequate for all domestic uses; in common with the others of the range it requires a heater current of ·2 amp., and is designed for series running such as in A.C./D.C. or D.C. receivers.

It will be noted that the valve is designed for a maximum anode and screen voltage of 150 volts owing to the fact that in general, no greater voltage can be obtained in the type of receivers in which it is used. These values must never be exceeded.

TECHNICAL DATA

Heater Voltage (approx.)	.. .. .	40
Heater Current (Amps.)	.. .. .	·2
Mutual Conductance at V_a 100, V_g 100, $V_g - 0$	.. .. .	4·0 m.a./v.
Maximum Anode Voltage	.. .. .	150
Maximum Screen Voltage	.. .. .	150
Grid Bias (Anode and Screen Volts 150)	.. .. .	-25 v.
Anode Current for 150 Anode and Screen Volts and -25 volts Grid Bias	.. .. .	36 m.a.
Maximum Anode Dissipation	.. .. .	8 watts.
Optimum Load	.. .. .	4000 ohms.

(The Screen Voltage should never exceed the Anode Voltage).

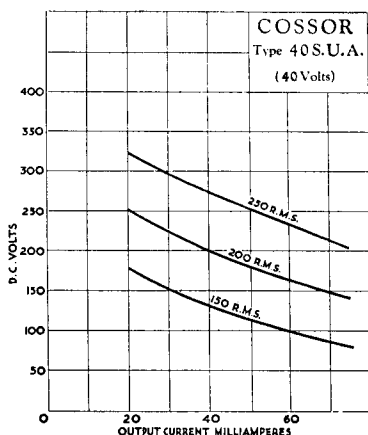


COSSOR RECTIFIERS

INDIRECTLY HEATED
HALF WAVE

COSSOR 40 S.U.A.

The Cossor 40 S.U.A. valve is a half-wave indirectly heated rectifier intended for series running with the Cossor 13-volt ·2 amp. series of indirectly heated mains valves. This valve is suitable for A.C./D.C. receivers.



TECHNICAL DATA

Heater Voltage	.. .. .	40
Heater Current (Amps.)	.. .. .	·2
Maximum Anode Voltage (R.M.S.)	.. .. .	250
Maximum Rectified Current	.. .. .	75 m.a.

The Cossor 40 S.U.A. is an indirectly heated rectifier having a heater current of ·2 amp., and is primarily introduced as a rectifier to be used in conjunction with the Cossor ·2 amp. series of mains valves, either to make possible the use of the receiver on D.C. or A.C. mains or to do away with the mains transformer in the set required for A.C. working only.

It is a single wave rectifier and has a maximum D.C. output of 75 m.a. at 210 volts when a potential of 250 r.m.s. is applied.

This particular valve enjoys the same robust constructional features as the directly heated Cossor rectifiers described on the preceding page.

COSSOR RECTIFIERS

DIRECTLY HEATED FULL AND HALF WAVE
(NON-STANDARD TYPES) FOR REPLACEMENT

Type	Rectification	Filament Volts	Filament Amps.	Max. Anode Volts (R.M.S.)	Max. Rectified Current (m.a.)	Max. D.C. Volts at Max. D.C. Current
408 B.U.	Full-wave	4	1	250-0-250	30	270
412 B.U.	" "	4	1	250-0-250	70	250
612 B.U.	" "	6	0·4	250-0-250	50	280
624 B.U.	" "	6	2	500-0-500	60	610
825 B.U.	" "	7·5	2	500-0-500	120	570
44 S.U.	Half-wave	4	0·4	200	20	230
412 S.U.	" "	4	1	250	70	190
660 S.U.	" "	6	4 to 4·5	1000	150	150

COSSOR 41 M.H.

4-VOLT 1 AMP. INDIRECTLY HEATED TRIODE

The 41 M.H. possesses a relatively high impedance, and a very high value of mutual conductance. Its principle use is as a detector valve, the high value of mutual conductance giving great sensitivity.

Anode bend rectification employing the 41 M.H. is very satisfactory, as the sharp cut-off gives sensitivity well above the average. A coupling resistance of 100,000 ohms is recommended, a condenser of '0002 mfd.' being suitable as an anode bypass.

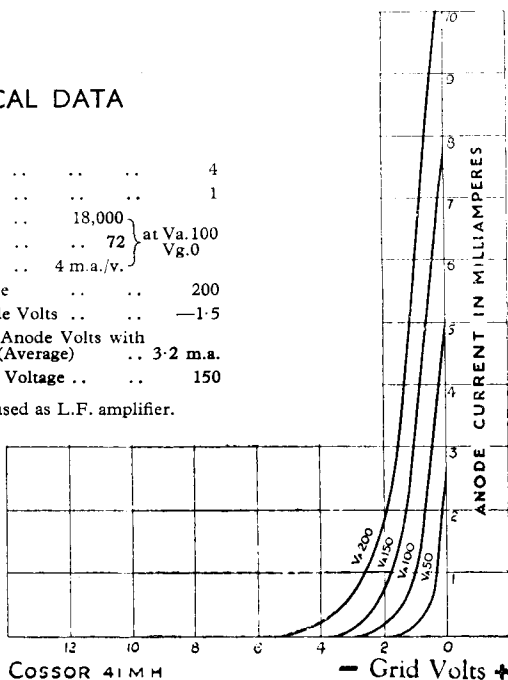
The 41 M.H. is also exceptionally suitable as a power grid detector, when a high value of stage gain is required in this stage.

TECHNICAL DATA

For Detector.

Heater Voltage	..	..	..	..	4
Heater Current (Amps.)	..	..	..	..	1
Impedance	..	..	..	18,000	} at $V_a. 100$ $V_g. 0$
Amplification Factor	..	..	..	72	
Mutual Conductance	..	..	..	4 m.a./v.	
Maximum Anode Voltage	..	..	..	200	
*Grid Bias for 200 Anode Volts	..	..	..	-1.5	
Anode Current for 200 Anode Volts with -1.5 volts Grid Bias (Average)	..	..	..	3.2 m.a.	
Normal Working Anode Voltage	..	..	..	150	

* Grid Bias when used as L.F. amplifier.



COSSOR 41 M.H.L.

4-VOLT 1 AMP. INDIRECTLY HEATED TRIODE

The 41 M.H.L. has a relatively low impedance and a very high value of mutual conductance. It is admirably suited to work in the detector position when the preceding amplification makes necessary a detector valve of rather low impedance.

As a power grid detector it will be found very sensitive, and in addition will permit of high stage gain. It is recommended that if a transformer follows this valve it should be shunt fed with 30,000 ohms and a coupling condenser of 1 mfd.

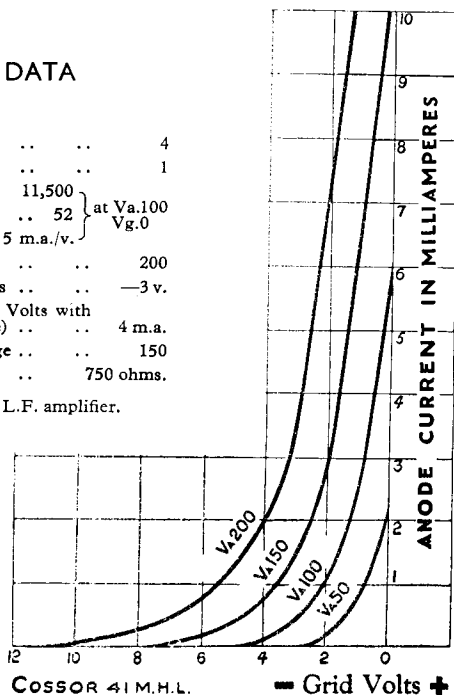
When using this valve as an anode bend detector, either resistance capacity coupling or transformer coupling may follow.

TECHNICAL DATA

For Detector or H.F.

Heater Voltage	..	..	..	..	4
Heater Current (Amps.)	..	..	..	..	1
Impedance	..	..	..	11,500	} at $V_a 100$ $V_g 0$
Amplification Factor	..	..	..	52	
Mutual Conductance	..	4.5	m.a./v.		
Maximum Anode Voltage	..	..	..	200	
*Grid Bias for 200 Anode Volts	..	..	..	-3 v.	
Anode Current for 200 Anode Volts with —3 volts Grid Bias (Average)	..	..	..	4 m.a.	
Normal Working Anode Voltage	..	..	..	150	
Bias Resistance	..	..	..	750 ohms.	

* Grid Bias when used as L.F. amplifier.



COSSOR 41 M.P.

4-VOLT 1 AMP. INDIRECTLY HEATED POWER OUTPUT

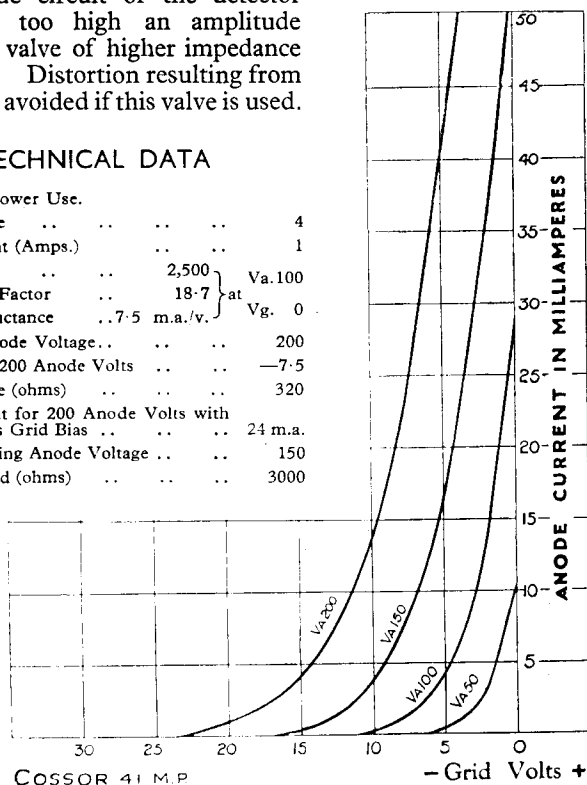
The 41 M.P. is a small triode output valve with an exceptionally high mutual conductance. It is very suitable for use in receivers where a large output is not required but where sensitivity is of primary importance. In these circumstances, the valve is a very convenient one and very pleasing quality is obtained.

The 41 M.P. is very suitable as a power grid or anode bend detector when the amplification of the preceding stages is such that the voltage developed across the grid-cathode circuit of the detector valve has too high an amplitude to allow a valve of higher impedance to be used. Distortion resulting from overload is avoided if this valve is used.

TECHNICAL DATA

For Normal Power Use.

Heater Voltage	4
Heater Current (Amps.)	1
Impedance	2,500
Amplification Factor	18.7
Mutual Conductance	7.5 m.a./v.
Maximum Anode Voltage	200
Grid Bias for 200 Anode Volts	-7.5
Bias Resistance (ohms)	320
Anode Current for 200 Anode Volts with -7½ volts Grid Bias	24 m.a.
Normal Working Anode Voltage	150
Optimum Load (ohms)	3000



COSSOR 41 M.P.G.

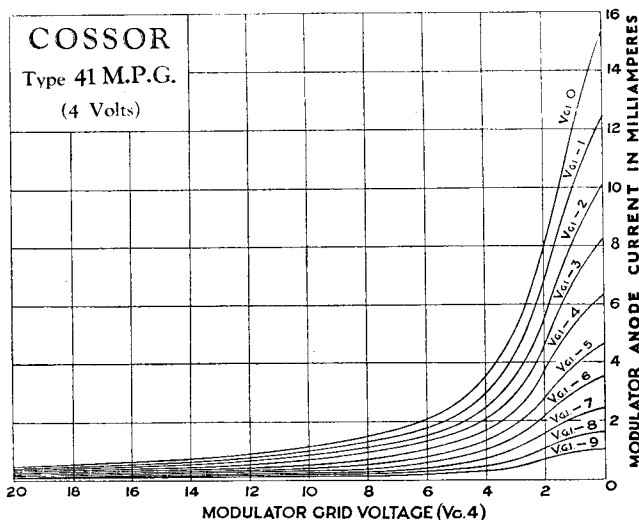
4-VOLT 1 AMP. INDIRECTLY HEATED PENTAGRID FREQUENCY CHANGER

The Cossor 41 M.P.G. is a variable-mu pentagrid valve, and is intended for frequency changing in a superheterodyne receiver, in which position it takes the place of the first detector and oscillator. The valve derives its nomenclature from the fact that it has five grids in addition to anode, cathode and heater.

Up to the introduction of this valve the problem of single valve frequency changing had been solved with only partial success, but the Cossor Pentagrid provides a complete and efficient solution devoid of the drawbacks of previous methods. The Cossor Pentagrid is distinguished by its high conversion conductance and inherent freedom from oscillator harmonics, two factors of vital importance in the design of the modern Superheterodyne Receiver.

TECHNICAL DATA

Heater Voltage	..	..	..	..	..	4
Heater Current (Amps.)	..	..	..	..	..	1
Mod. Anode Voltage (Max.)	..	..	..	..	..	250
Mod. Screen Voltage (Max.)	..	..	..	..	..	100
Mod. Grid Voltage (Under recommended working conditions)	..	..	..	..	..	— 1.5 to — 10
Osc. Anode Voltage (Max.)	..	..	..	..	..	100



COSSOR 41 M.X.P.

4-VOLT 1 AMP. INDIRECTLY HEATED
SUPER POWER OUTPUT

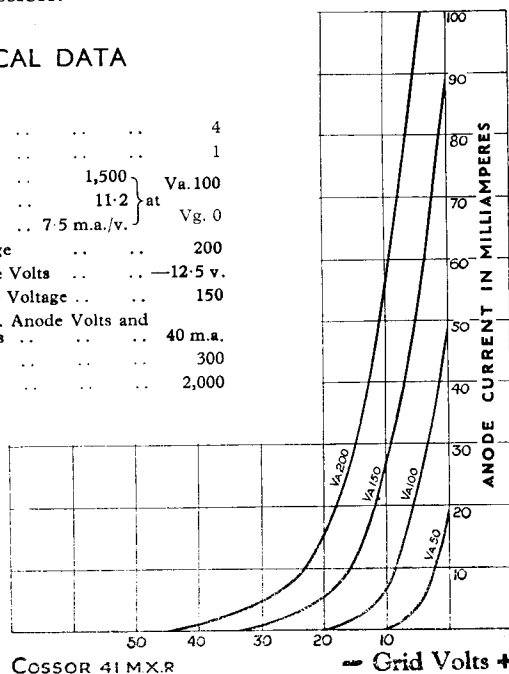
The 41 M.X.P. possesses the same high value of mutual conductance as the 41 M.P., but has a somewhat lower impedance and a relatively larger value of undistorted output. Used under suitable conditions this valve will provide sufficient volume for all domestic purposes.

The sensitivity of the valve is very high, a signal of approximately 8 volts R.M.S. being sufficient to load the valve completely. Owing to the large mutual conductance it is advisable to use a grid stopper resistance and, in some cases, a small resistance in the anode circuit. Both resistances should be as close to the valveholder as possible.

TECHNICAL DATA

For Extra Power Use.

Heater Voltage	4
Heater Current (Amps.) .. .	1
Impedance	1,500
Amplification Factor	11.2
Mutual Conductance	7.5 m.a./v.
Maximum Anode Voltage	200
Grid Bias for 200 Anode Volts	-12.5 v.
Normal Working Anode Voltage	150
Anode Current for max. Anode Volts and -12.5 volts Grid Bias	40 m.a.
Bias Resistance (ohms)	300
Optimum Load (ohms)	2,000



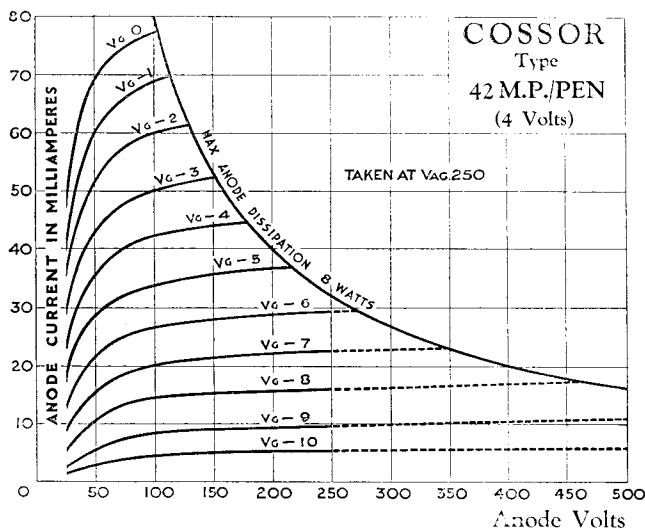
COSSOR 42 M.P./PEN.

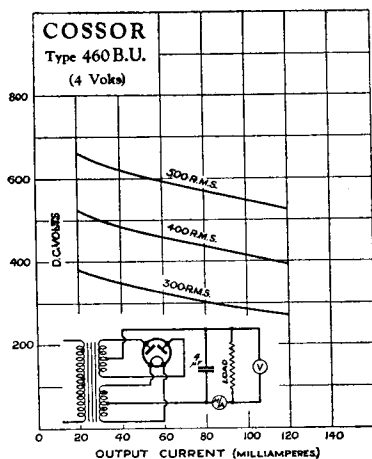
4-VOLT 2 AMP. INDIRECTLY HEATED HIGH SLOPE PENTODE

This valve is an indirectly heated pentode output valve capable of giving very large undistorted volume. It is characterised by an exceptionally high slope, which enables it to deliver full output for a very small input. For this reason it may be fed directly from a double diode detector such as the Cossor D.D.4, when the latter is preceded by adequate H.F. amplification as in a Superheterodyne Receiver.

TECHNICAL DATA

Heater Voltage	.. .. .	4
Heater Current (Amps.)	.. .. .	2
Mutual Conductance	.. .. .	7.0 m.a./v.
Maximum Anode Voltage	.. .. .	250
Maximum Screen Voltage	.. .. .	250
Grid Bias for 250 volts on Anode and Screen	.. .. .	— 5.5 v.
Grid Bias for 200 volts on Anode and Screen	.. .. .	— 4 v.
Anode Current for 250 volts on Anode and Screen	.. .. .	32 m.a.
Anode Current for 200 volts on Anode and Screen	.. .. .	28 m.a.
Bias Resistance for 250 volts on Screen and Anode	.. .. .	140 ohms
Bias Resistance for 200 volts on Screen and Anode	.. .. .	120 ohms
Optimum Load	.. .. .	8,000 ohms





COSSOR RECTIFIERS

DIRECTLY HEATED
STANDARD (FULL WAVE)
COSSOR 460 B.U.

The 460 B.U. is a full wave rectifier, similar to the 442 B.U., but giving sufficient voltage for 400-500 volt valves.

Technical Data.

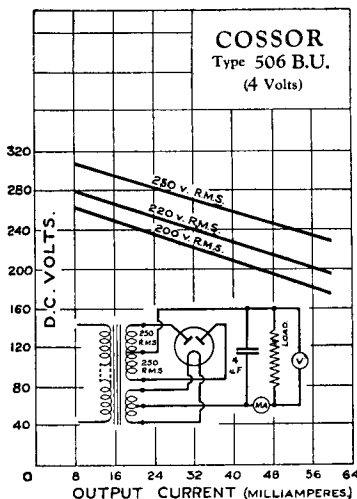
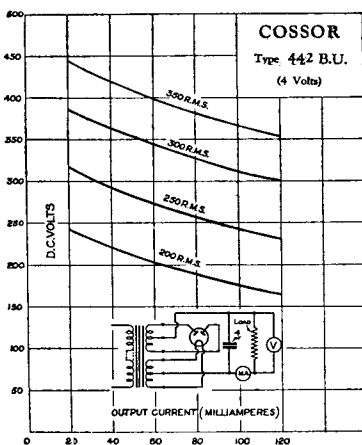
Filament Voltage	..	4
Filament Current (Amps.)	..	2.5
Maximum Anode Voltage (R.M.S.)	..	500-0-500
Maximum Rectified Current	..	120 m.a.

COSSOR 506 B.U.

The 506 B.U. is a full wave rectifying valve of moderate dissipation, and may be allowed to give up to 60 m.a. with an anode voltage not exceeding 250 R.M.S. on each anode.

Technical Data.

Filament Voltage	..	4
Filament Current (Amps.)	..	1.0
Maximum Anode Voltage (R.M.S.)	..	250-0-250
Maximum Rectified Current	..	60 m.a.



COSSOR 442 B.U.

The 442 B.U. is a full wave rectifying valve very suitable for sets that require 200 volts at the anode of each valve. 442 B.U. is the rectifier valve in most general use.

Technical Data.

Filament Voltage	..	4
Filament Current (Amps.)	..	2.5
Maximum Anode Voltage (R.M.S.)	..	350-0-350
Maximum Rectified Current	..	120 m.a.

All the above ratings are based on the assumption that a condenser of not less than 4 mfd. is placed across the load.

COSSOR 4 X.P.

4-VOLT 1 AMP. DIRECTLY HEATED MAINS POWER OUTPUT

The 4 X.P. is a modern super-power valve capable of supplying considerable output. The efficiency of the valve is good for a triode and the sensitivity, as evidenced by the mutual conductance of 7 m.a./v., is also high. The maximum allowable dissipation at the anode is 12 watts, and this must not be exceeded.

The valve is of the directly heated type and, if automatic bias is used, care must be taken that the resistance across the filament terminals is truly centre tapped, otherwise hum will result. No hum need be feared, however, due to lack of thermal inertia of the filament.

For large radiogram receivers or amplifiers, two of these valves in push-pull give an output adequate for almost all purposes. A large energised speaker should be used.

TECHNICAL DATA

For Extra Power Use.

Filament Voltage	.. .. .	4
Filament Current (Amps.)	.. .. .	1.0
Impedance (ohms)	.. .. .	900
Amplification Factor	.. .. .	6.3
Mutual Conductance	.. .. .	7 m.a./v.
Maximum Anode Voltage	.. .. .	250

WITH A.C. HEATED FILAMENT.

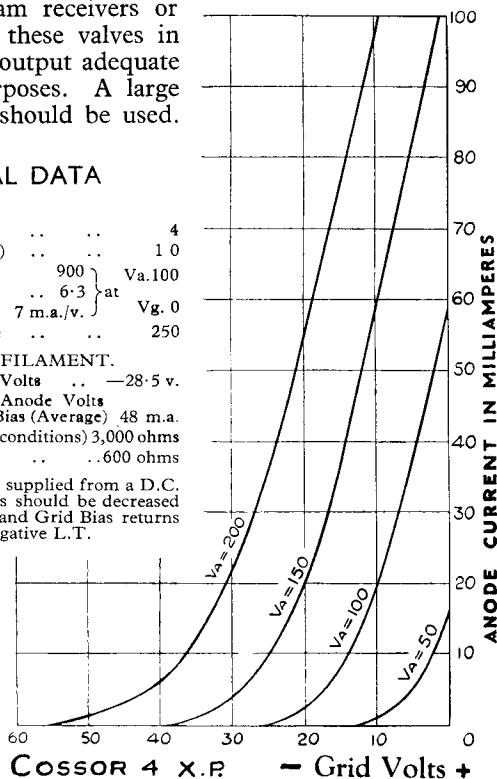
Grid Bias for 250 Anode Volts .. —28.5 v.

Anode Current for 250 Anode Volts
with —28.5 volts Grid Bias (Average) 48 m.a.

Optimum Load (for above conditions) 3,000 ohms

Bias Resistor 600 ohms

Should the filament be supplied from a D.C. source the bias values should be decreased by 2 volts, the H.T. and Grid Bias returns being made to the negative L.T.



COSSOR D.D.4.

4 VOLT ·75 AMP. INDIRECTLY HEATED DOUBLE DIODE

The D.D.4 is a valve designed primarily for use in sets in which automatic volume control is to be provided. It consists of two diodes, one of which is intended for detection of the signal, while the other provides the voltage necessary for A.V.C. These derive their electron current from the same cathode. The D.D.4 in many cases should be followed by a stage of L.F. amplification which precedes the output valve ; for this purpose the user has a wide choice of valves (e.g. triode, variable- μ screened pentode, etc.) to suit the particular conditions imposed by the output valve. If the diode is used in combination with the high sensitivity Cossor output pentode 42 M.P./Pen, however, the L.F. stage may be dispensed with and the 42 M.P./Pen may be fed directly from the diode. This method is particularly recommended. By using a separate diode to provide the A.V.C. voltage, it becomes possible to prevent the A.V.C. System from coming into operation unless the signal would overload the output valve in its absence. In this way the sensitivity of the receiver is in no way impaired by adding automatic volume control to it. Such a system, in which A.V.C. only comes into use on a signal exceeding some pre-arranged strength, is called " ' delayed A.V.C. ' " In the D.D.4 voltage delay is arranged by a small negative voltage on the anode of the diode which is being used for A.V.C. No current will flow until the peak voltage of the signal exceeds the delay voltage, after which rectification will take place in the normal way, providing a D.C. voltage change which can be passed back to the grids of the preceding variable- μ amplifier valves to control the sensitivity of the set.

It is to be noted that automatic volume control should only be fitted to receivers having adequate H.F. or I.F. gain. No purpose is served in fitting it to receivers of low sensitivity.

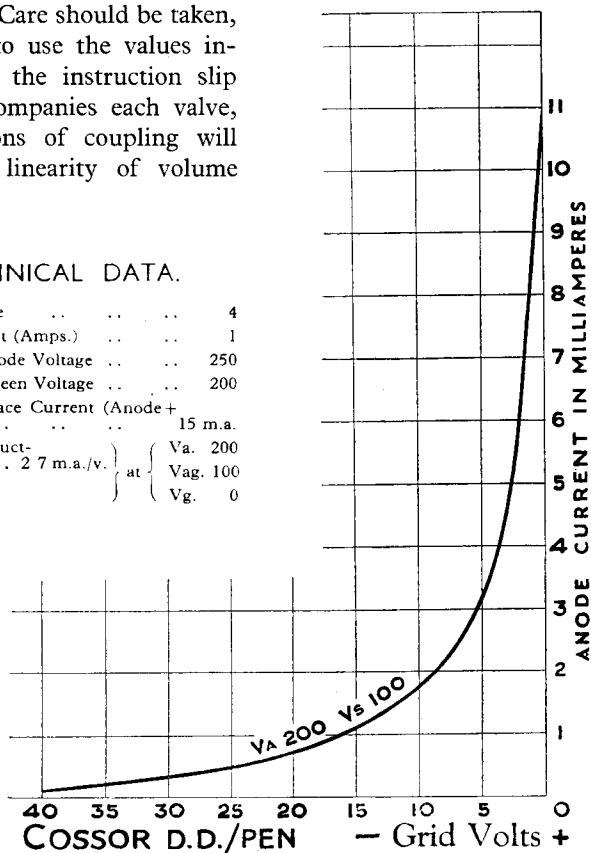
COSSOR D.D./PEN

4-VOLT 1 AMP. INDIRECTLY HEATED DOUBLE DIODE PENTODE

This valve is a special variable-mu L.F. pentode with two small diode valves all sharing a common cathode. This valve is intended for corrected Automatic Volume Control, the gain being varied both in preceding stages and on the pentode portion. This system ensures a very level and perfect control of volume, correcting for the inevitable changes in voltage to the output valve given by more simple systems. Care should be taken, however, to use the values indicated in the instruction slip which accompanies each valve, as variations of coupling will spoil the linearity of volume control.

TECHNICAL DATA.

Heater Voltage	..	..	..	4
Heater Current (Amps.)	..	..	..	1
Maximum Anode Voltage	..	..	..	250
Maximum Screen Voltage	..	..	..	200
Maximum Space Current (Anode + Screen)	..	..	..	15 m.a.
Mutual Conductance	..	2.7 m.a./v.	at	$\left\{ \begin{array}{l} V_a. 200 \\ V_{g2}. 100 \\ V_{g1}. 0 \end{array} \right.$



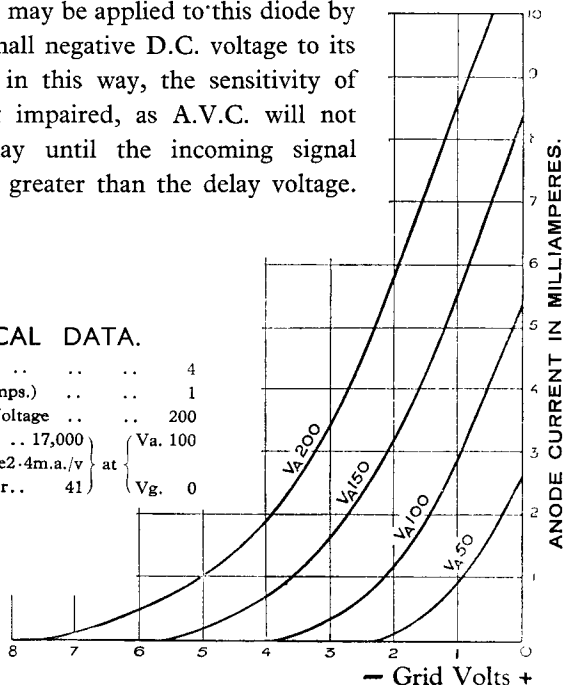
COSSOR D.D.T.

4-VOLT 1 AMP. INDIRECTLY HEATED DOUBLE DIODE TRIODE

The Cossor D.D.T. is intended for Automatic Volume Control, and takes the form of a triode valve with two diodes all sharing the same cathode. One diode is usually used as a normal detector, its rectified output being passed to the grid of the D.D.T. for amplification. The other diode is used to provide a D.C. voltage for use in the amplification control of the preceding valves. Delay may be applied to this diode by supplying a small negative D.C. voltage to its anode. Used in this way, the sensitivity of the set is not impaired, as A.V.C. will not come into play until the incoming signal reaches values greater than the delay voltage.

TECHNICAL DATA.

Heater Voltage	.. .. .	4
Heater Current (Amps.)	.. .. .	1
Maximum Anode Voltage	.. .. .	200
Impedance (ohms)	.. 17,000	} at { V_a 100 V_g 0
Mutual Conductance	2.4m.a./v	
Amplification Factor	.. 41	



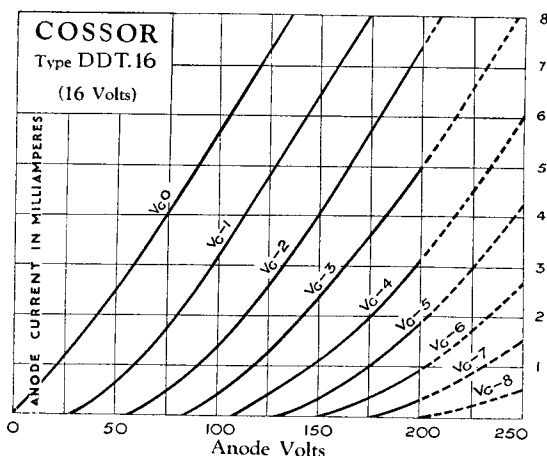
COSSOR D.D.T. 16

16-VOLT ·25 AMP. INDIRECTLY HEATED DOUBLE DIODE TRIODE

The Cossor D.D.T.16 is intended for Automatic Volume Control, and takes the form of a triode valve with two diodes all sharing the same cathode. The second diode makes it possible to apply delay when using this valve, the extent of which can be regulated as desired by a small negative potential applied to the controlling diode. Used in this way, the sensitivity of the set is not impaired, as A.V.C. will not come into play until the incoming signal reaches a value greater than the delay voltage.

TECHNICAL DATA

Heater Voltage	..	..	..	..	..	16
Heater Current (Amps.)	..	..	..	..	..	.25
Maximum Anode Voltage	..	..	..	..	..	200
Impedance (ohms) at Va. 100, Vg. 0	..	..	..	..	..	16,000
Mutual Conductance at Va. 100, Vg. 0	..	..	..	..	..	2.5 m.a./v.
Amplification Factor at Va. 100, Vg. 0	..	..	..	..	..	40
Bias Resistance (ohms)	..	..	..	..	..	1,000—1,250



COSSOR D.H.L.

16 VOLT ·25 AMP. INDIRECTLY HEATED MAINS TRIODE

The D.H.L. has relatively low impedance and a high value of mutual conductance. It is therefore highly suitable to work in the detector position of a D.C. mains set, and is capable of handling large input.

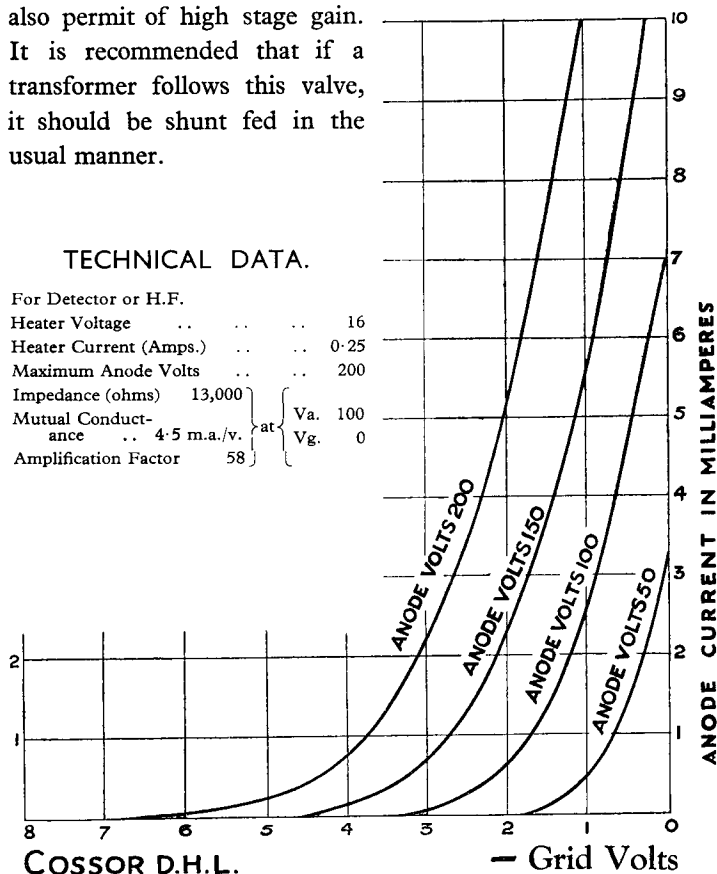
As a power grid detector it will be found very sensitive, and will also permit of high stage gain. It is recommended that if a transformer follows this valve, it should be shunt fed in the usual manner.

TECHNICAL DATA.

For Detector or H.F.

Heater Voltage	.. .. .	16
Heater Current (Amps.)	.. .. .	0·25
Maximum Anode Volts	.. .. .	200
Impedance (ohms)	13,000	
Mutual Conductance	.. 4·5 m.a./v.	
Amplification Factor	58	

at $\left. \begin{array}{l} V_a. 100 \\ V_g. 0 \end{array} \right\}$



COSSOR D.P./PEN.

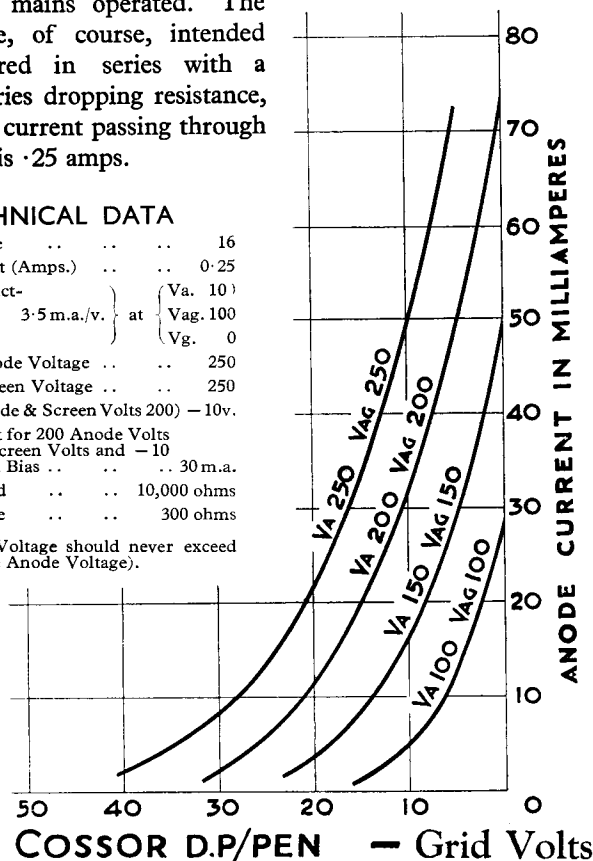
16 VOLT ·25 AMP. INDIRECTLY HEATED MAINS OUTPUT PENTODE

For operating moving coil loud speakers, the Cossor D.P./PEN. is supreme among mains indirectly heated D.C. pentodes. It is capable of delivering big, undistorted volume with perfect quality. When occasion arises for using this valve with moving iron loud speakers, a tone corrector should be employed, which is true of any pentode, whether battery or mains operated. The heaters are, of course, intended to be wired in series with a suitable series dropping resistance, so that the current passing through the heater is ·25 amps.

TECHNICAL DATA

Heater Voltage	16
Heater Current (Amps.)	0·25
Mutual Conduct- ance .. 3·5 m.a./v. } at	$\left. \begin{array}{l} V_a. 10 \\ V_{ag}. 100 \\ V_g. 0 \end{array} \right\}$
Maximum Anode Voltage	250
Maximum Screen Voltage	250
Grid Bias (Anode & Screen Volts 200) - 10v.	
Anode Current for 200 Anode Volts and 200 Screen Volts and - 10 volts Grid Bias	30 m.a.
Optimum Load	10,000 ohms
Bias Resistance	300 ohms

(The Screen Voltage should never exceed the Anode Voltage).



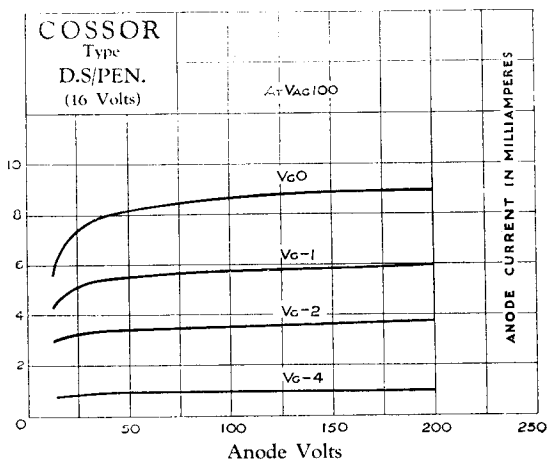
COSSOR D.S./PEN.

16 VOLT ·25 AMP. INDIRECTLY HEATED MAINS H.F. SCREENED PENTODE

This valve is similar to the D.V.S./Pen., but has no variable- μ characteristics. It may be used in place of an ordinary screen grid valve, or may be used for any of the functions suggested for the D.V.S./Pen. where bias volume control is not required. Another use for this valve is in the detector stage, where it offers possibilities of very high gain combined with very low damping on the preceding tuned circuit. The suppressor grid of this valve is brought out to a separate pin in the case of the seven-pin base type; in the case of the five-pin base type the suppressor grid is connected to cathode. The metallised coating is also brought out to a separate pin, which is often very convenient.

TECHNICAL DATA

Heater Voltage	..	..	..	..	..	..	16
Heater Current (Amps.)	..	..	..	..	..	..	·25
Maximum Anode Voltage	..	..	..	..	..	..	200
Maximum Auxiliary Grid Voltage	..	..	..	..	..	..	100
Mutual Conductance at V_a 200, V_{ag} 100, V_g 0	..	..	..	..	..	..	3·0 m.a./v.
At V_a 200, V_{ag} 100, V_g -1·5	..	..	..	..	..	..	2·3 m.a./v.



COSSOR D.V.S.G.

16-VOLT ·25 AMP. MAINS INDIRECTLY HEATED VARIABLE MU SCREENED GRID

This valve is a special type of indirectly heated D.C. Mains screened grid valve, having variable-mu characteristics giving important advantages over ordinary types. The valve is so constructed that variation of grid bias permits what is unquestionably the most efficient form of volume control; this system is very convenient and has no adverse effect upon tuning or quality.

As a variation in bias causes a variation in screen current, the screening grid should be fed by some form of potentiometer of correct value to keep the voltage appreciably constant.

TECHNICAL DATA.

For H.F. Amplification with Bias Volume Control.

Heater Voltage 16

Heater Current (Amps.) 0·25

Maximum Anode Voltage 200

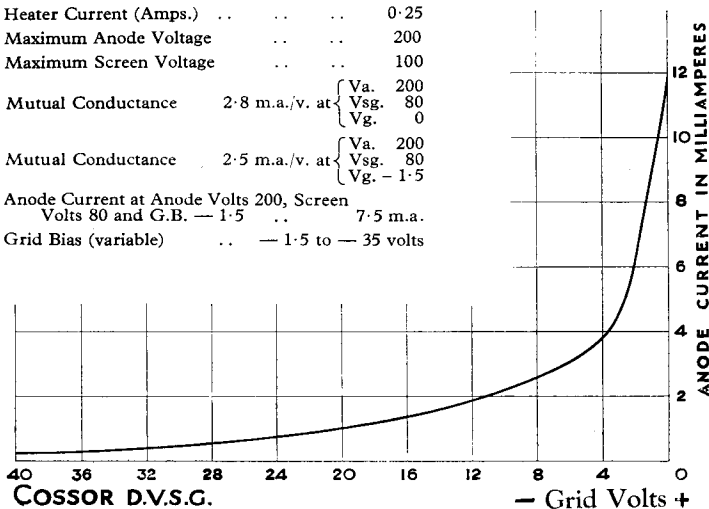
Maximum Screen Voltage 100

Mutual Conductance 2·8 m.a./v. at $\begin{cases} \text{Va.} & 200 \\ \text{Vsg.} & 80 \\ \text{Vg.} & 0 \end{cases}$

Mutual Conductance 2·5 m.a./v. at $\begin{cases} \text{Va.} & 200 \\ \text{Vsg.} & 80 \\ \text{Vg.} & -1·5 \end{cases}$

Anode Current at Anode Volts 200, Screen Volts 80 and G.B. — 1·5 .. 7·5 m.a.

Grid Bias (variable) .. — 1·5 to — 35 volts



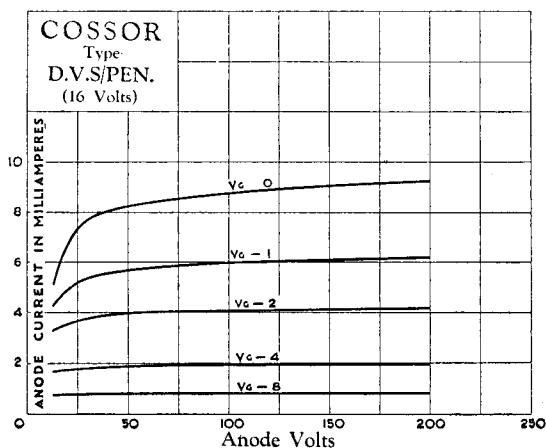
COSSOR D.V.S./PEN.

16 VOLT ·25 AMP. INDIRECTLY HEATED VARIABLE MU H.F. PENTODE

The Cossor D.V.S./Pen. is a variable-mu high frequency screened pentode, and generally speaking it may be used in place of any reasonably equivalent screened grid valve, when it will give results equal to or better than previously experienced, according to the coupling used. The suppressor grid is brought out to a separate pin in the seven-pin base type, which makes possible the use of the valve in various special ways, such as for frequency changing; negative potential applied to this grid will greatly decrease the impedance—a function that may be used in special sets for simultaneously decreasing the gain and flattening the tuning, permitting the most perfect quality from the local station. The valve is also available with five-pin base, where the suppressor grid is connected to cathode.

TECHNICAL DATA

Heater Voltage	..	..	..	..	..	..	16
Heater Current (Amps.)	..	..	..	..	..	..	·25
Maximum Anode Voltage	..	..	..	..	..	..	200
Maximum Auxiliary Grid Voltage	..	..	..	..	..	..	100
Mutual Conductance at V_a 200, V_g 100, V_g 0	..	..	..	..	..	..	3·0 m.a./v.
At V_a 200, V_g 100, V_g —1·5	..	..	..	..	..	..	2·0 m.a./v.
Negative Grid Voltage (Variable)	..	..	..	..	..	..	—1·5 to —20



COSSOR M.P./PEN.

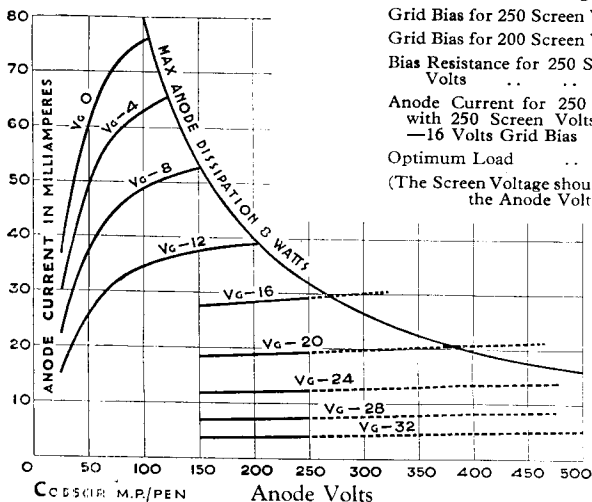
4-VOLT 1 AMP. INDIRECTLY HEATED PENTODE

The M.P./PEN. is a medium sensitivity indirectly heated output pentode having a maximum anode dissipation of 8 watts. Such pentode valves have one great advantage as compared with triodes of the same class; this lies in the fact that their efficiency is very much higher. For a given anode voltage, the ratio of watts given out to watts of high tension energy expended is very much higher. Very much larger volume is to be obtained from the M.P./Pen., therefore, than from the 41 M.X.P.

The quality to be obtained from such pentodes has sometimes been adversely criticised. This criticism usually has its origin in the use of an inadequate corrector circuit. This corrector circuit is very simple, consisting only of a condenser of .01 mfd. and a resistance of 10,000 ohms joined in series across the speaker terminals. The exact values depend on the characteristics of the loud speaker, but those given are reasonably satisfactory in all cases.

TECHNICAL DATA

Heater Voltage	..	..	4
Heater Current (Amps.)	..	..	1
Mutual Conductance	3.5 m.a./v. at	{	Va. 100
		{	Vg. 100
		{	Vg. 0
Maximum Anode Voltage	..	..	250
Maximum Screen Voltage	..	..	250
Grid Bias for 250 Screen Volts	..	..	-16 v.
Grid Bias for 200 Screen Volts	..	..	-10 v.
Bias Resistance for 250 Screen Volts	..	..	450 ohms
Anode Current for 250 Volts with 250 Screen Volts and -16 Volts Grid Bias	..	..	30 m.a.
Optimum Load	..	..	10,000 ohms
(The Screen Voltage should never exceed the Anode Voltage).			



COSSOR M.S.G./H.A.

4-VOLT 1 AMP. INDIRECTLY HEATED SCREENED GRID

This valve is a screened grid valve having a high amplification factor. It has been very largely used as an H.F. amplifier, and is well suited for this purpose providing that the signal to be amplified is small.

The inter-electrode capacity is the same as that of the battery valve, which is of the order of .001 micro-microfarads, which permits the valve when used in conjunction with suitable coils to develop a high stage gain, stability being perfectly maintained. For maximum stage gain this valve should be used with a coupling having the equivalent to a ratio of 1 : 1, which may take the form of a tuned transformer of this ratio, or alternatively untapped tuned grid or untapped tuned anode coupling.

TECHNICAL DATA

For Super H.F. Amplification.

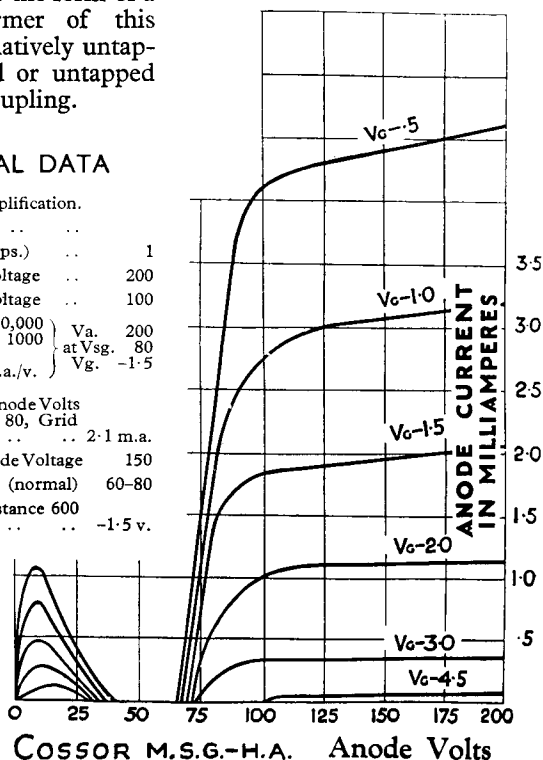
Heater Voltage	..	..
Heater Current (Amps.)	..	1
Maximum Anode Voltage	..	200
Maximum Screen Voltage	..	100
Impedance	..	500,000
Amplification Factor 1000	} at Vsg. 80	Va. 200
Mutual Conductance		Vg. -1.5
	..	a./v.

Anode Current for Anode Volts
150, Screen Volts 80, Grid
Bias -1.5 2.1 m.a.

Normal Working Anode Voltage 150

Screen Grid Voltage (normal) 60-80

Grid Bias (Bias Resistance 600
ohms) -1.5 v.



COSSOR M.S.G./L.A.

4-VOLT 1 AMP. INDIRECTLY HEATED SCREENED GRID

This valve has a considerably lower amplification factor than the M.S.G./H.A., but has a very high value of mutual conductance for such a valve. Its gain, therefore, will be even larger than the M.S.G./H.A. if the correct coupling is used. Here again, the valve is not suited for the amplification of large signals.

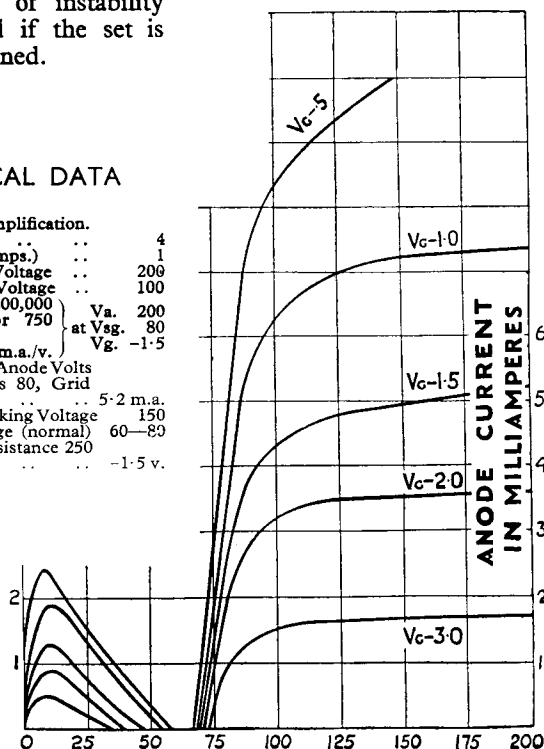
The M.S.G./L.A. permits considerable scope and latitude in design, as for both maximum stage gain and selectivity a step-up ratio of several times is desirable in the coupling. The inter-electrode capacity is very low, of the order of .001 micro-microfarads, which with the step-up coupling makes it impossible for the point of instability to be reached if the set is correctly screened.

TECHNICAL DATA

For Super H.F. Amplification.

Heater Voltage	..	4
Heater Current (Amps.)	..	1
Maximum Anode Voltage	..	200
Maximum Screen Voltage	..	100
Impedance	..	200,000
Amplification Factor	750	at $V_{a.}$ 200
Mutual Con-		at $V_{sg.}$ 80
ductance	3.75 m.a./v.	$V_{g.}$ -1.5

Anode Current for Anode Volts	150, Screen volts 80, Grid Bias -1.5	..	5.2 m.a.
Normal Anode Working Voltage	150		
Screen Grid Voltage (normal)	60—80		
Grid Bias (Bias Resistance 250 ohms)	..		-1.5 v.



COSSOR M.S.G.-L.A. Anode Volts

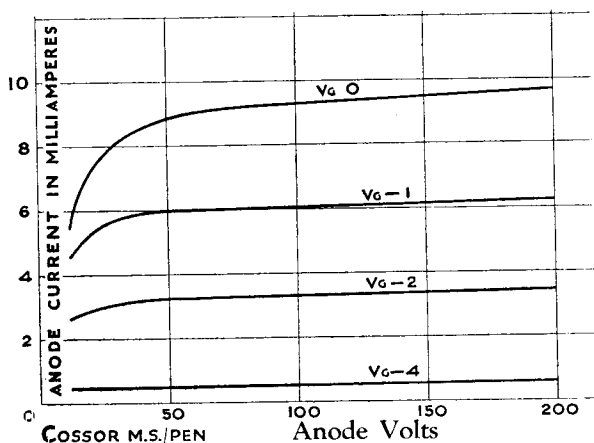
COSSOR M.S./PEN.

4-VOLT 1 AMP. INDIRECTLY HEATED H.F. PENTODE

This valve is similar to the M.V.S./PEN., but has no variable-mu characteristics. It may be used in place of an ordinary screen grid valve, or may be used for any of the functions suggested for the M.V.S./PEN. where bias volume control is not required, and where the signal voltage to be amplified is not large. Another use for this valve is in the detector stage, where it offers possibilities of very high gain combined with complete stability. The suppressor grid of this valve is brought out to a separate pin in the case of the seven-pin base type; in the case of the five-pin base type, the suppressor grid is connected to cathode. The metallised coating is also brought out to a separate pin, which is often very convenient.

TECHNICAL DATA

Heater Voltage	..	..	..	..	..	4
Heater Current (Amps.)	..	..	..	..	..	1
Maximum Anode Voltage	..	..	..	..	..	200
Maximum Auxiliary Grid Voltage	..	..	..	..	..	100
Mutual Conductance at Va. 200, Vag. 100, Vg. 0	..	..	..	..	..	3.5 m.a./v.
At Va. 200, Vag. 100, Vg. -1.5	..	..	..	..	..	2.8 m.a./v.



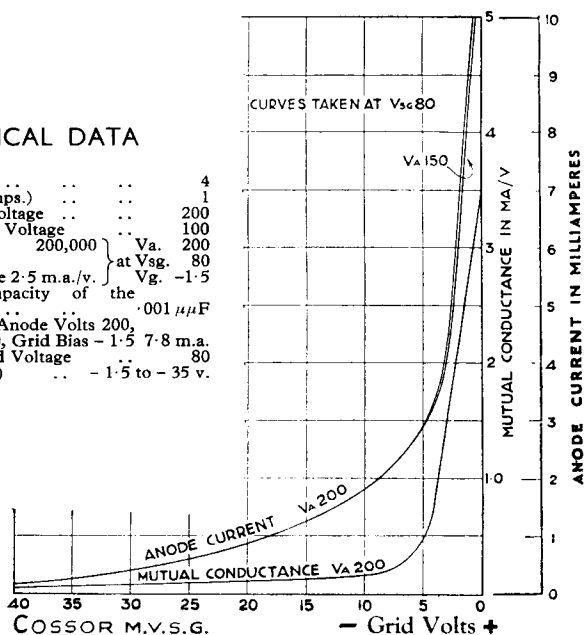
COSSOR M.V.S.G.

4-VOLT 1 AMP. INDIRECTLY HEATED VARIABLE μ u. SCREENED GRID

This is a specialised type of screened valve which, when correctly used, has several important advantages over the ordinary type. The special form of its grid-volts anode-current characteristic is such as to permit of volume control by means of a variation of grid bias—a system which is convenient in application and has no adverse effect upon tuning or quality.

TECHNICAL DATA

Heater Voltage	..	..	4
Heater Current (Amps.)	..	..	1
Maximum Anode Voltage	..	..	200
Maximum Screened Voltage	..	..	100
Impedance	..	200,000	
			V_a 200
			at V_{sg} 80
Mutual Conductance	2.5 m.a./v.		V_g -1.5
Inter-electrode Capacity of the order of	..	..	.001 μ F
Anode Current for Anode Volts 200			
Screen Volts 80, Grid Bias	-1.5	7.8 m.a.	
Normal Screen Grid Voltage	..	..	80
Grid Bias (Variable)	..	-1.5 to -35 v.	



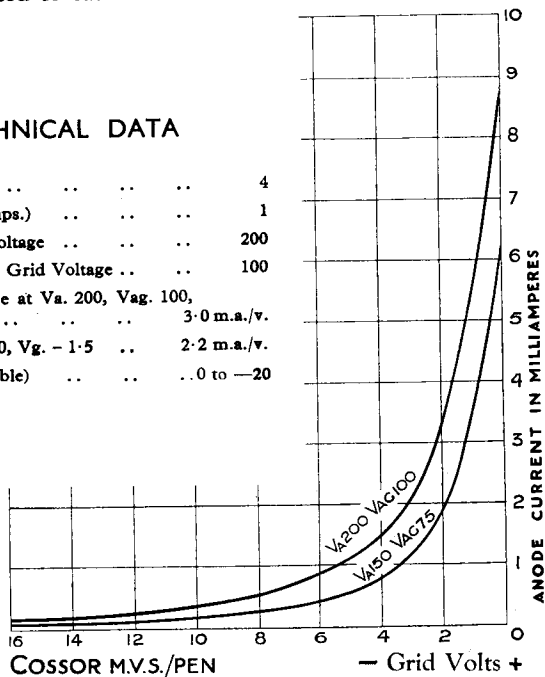
COSSOR M.V.S./PEN.

4-VOLT 1 AMP. INDIRECTLY HEATED
VARIABLE MU. H.F. PENTODE.

The Cossor M.V.S./PEN. is a variable-mu high frequency screened pentode. It is particularly useful as a high frequency or intermediate frequency amplifier. Its variable-mu characteristic permits of manual volume control by means of variation of grid bias, or of the application of automatic volume control. The suppressor grid is brought out to a separate pin in the seven-pin base type, which makes possible the use of the valve in various special ways, such as for frequency changing. In addition, negative potential applied to this grid will greatly decrease the impedance—a function that may be used in special sets for simultaneously decreasing the gain and flattening the tuning, permitting the most perfect quality from the local station. The valve is also available with five-pin base where the suppressor grid is connected to cathode.

TECHNICAL DATA

Heater Voltage	..	..	..	..	4
Heater Current (Amps.)	..	..	..	..	1
Maximum Anode Voltage	..	..	..	..	200
Maximum Auxiliary Grid Voltage	..	..	..	..	100
Mutual Conductance at V_a 200, V_g 100,					
V_g 0	..	..	..	..	3.0 m.a./v.
At V_a 200, V_g 100, V_g -1.5	..	..	..	..	2.2 m.a./v.
Grid Voltage (Variable)	..	..	..	..	..0 to -20



COSSOR P.T.41

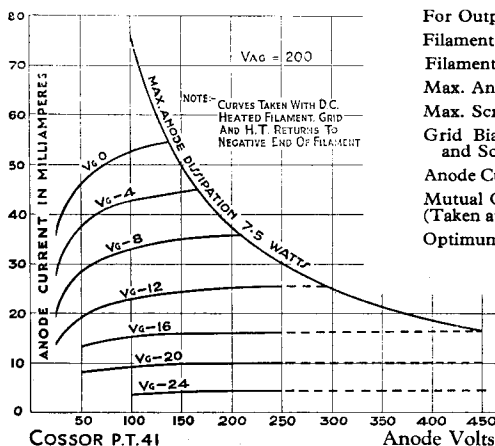
4-VOLT 1 AMP. DIRECTLY HEATED PENTODE

The P.T. 41 is a directly heated pentode valve capable of delivering a volume of undistorted output sufficient for all domestic purposes ; at the same time the sensitivity is sufficiently high to permit it to be fully loaded by a detector with transformer coupling.

It is very similar to the M.P./Pen., but may have advantages in certain receivers by virtue of its directly heated filament. Automatic bias is obtained in the usual manner for directly heated valves by the use of a small centre tapped resistance across the filament terminals.

In common with other pentodes the correct anode load should be used if the full value of undistorted output is to be reached.

TECHNICAL DATA



For Output.

Filament Voltage	4
Filament Current (Amps.) ..	1.0
Max. Anode Volts	250
Max. Screen Volts	200
Grid Bias for Max. Anode and Screen Volts ..	-12.5
Anode Current for above (m.a.)	30
Mutual Conductance	3 m.a./v.
(Taken at V_a 100, V_{Ag} 100, V_g 0.)	
Optimum Load ..	8,000 ohms

COSSOR P.T. 41 B.

4-VOLT 1 AMP. DIRECTLY HEATED PENTODE

Where large values of undistorted output are required, a high voltage pentode is a very useful valve. One reason for this is the high efficiency of this type of valve from the point of wattage dissipation against output delivered.

The P.T. 41 B. is a directly heated heavy duty valve which takes a rated anode voltage of 400, and has a maximum anode dissipation of 12 watts. In general, a stage of low frequency amplification will be necessary to precede this valve, as an input of approximately 40 volts peak is required for full output.

TECHNICAL DATA

For Output.

Filament Voltage	4
Filament Current (Amps.)	1.0
Maximum Anode Volts	400
Maximum Screen Volts	300
Grid Bias for Maximum Anode and Screen Volts	-40
Anode Current for above	30 m.a.
Mutual Conductance (at V_a 100, V_g 100, V_g 0.)	2.25 m.a./v.
Optimum Load	8,000 ohms

