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# IN THIS ISSUE

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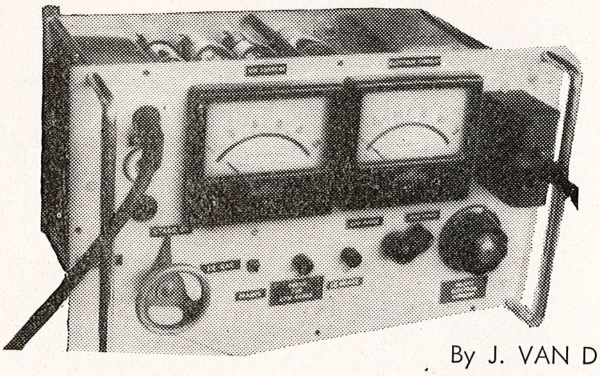


# Ionization Gauge Controller

By J. VAN DER GOOT, ing.
(Power Valve Section, Amalgamated Wireless Valve Co. Pty. Ltd.)

**SUMMARY**

**Working from fundamentals, general design equations are derived and applied to the design of a typical controller for the Radiotron vacuum ionization gauge AV26. The rate of stabilization of this controller was found to agree with the theoretical value calculated from the design equations. This controller meets the stabilization requirements for general high vacuum work and the circuit is more simple and less costly than existing comparable methods.**

## INTRODUCTION.

An ionization gauge is designed for the measurement of very low gas pressures in vacuum systems. A high vacuum ionization gauge of the hot filament type is basically a triode with a "grid" operating at a positive potential and a "plate", called ion collector, operating at a negative potential with respect to the filament. Electrons are emitted from the filament and attracted towards the positive grid. These electrons when colliding with gas molecules form ions which are collected by the (negative) ion collector. A controller for such a gauge must provide:

1. filament supply,
2. positive grid voltage supply,
3. negative ion collector voltage supply,
4. grid current metering,
5. ion collector current metering,
6. de-gas supply for the grid (in the case of the AV26).

The ion current is proportional to the gas pressure and is also proportional to the grid current; it depends to an extent on the grid voltage and on the ion collector voltage. The grid current depends to a small degree on the grid voltage but principally on the emission of the filament. If no measures for stabilization are taken the grid current will be unstable. This instability is caused by mains voltage variations and by gas pressure variations in the ionization gauge itself. Instability is severe: firstly, because of the exponential nature of Richardson's equation governing filament emission, secondly because of changes in the work function of the filament surface due to gas pressure variations. Therefore, to obtain steady gas pressure readings grid current stabilization is imperative.

If the ionization gauge is to be used for leak detection, adequate grid current stabilization of the controller is even more important. For this purpose the leak is probed by ether, acetone or butane gas (those fluids possess greater ionization properties than air). The resultant change in ion current, as these gases penetrate a leak in the high vacuum system, may be obscured by the fluctuations as described above. Thus the ultimate sensitivity of this type of leak detection is determined by the rate of stabilization of the grid current.

To obtain the low pressure readings required it is necessary to bake the gauge first, driving out absorbed gases and vapours from internal surfaces. In the Radiotron AV26 this is done by passing a heavy current through the grid helix, so raising its temperature to 800-900°C which quite effectively "de-gases" the gauge.

A recent issue of "Le Vide" (see reference) introduces a novel method for grid current stabilization in a vacuum ionization gauge. Some circuits use gas tetrodes which require special transformers, whereas the controller described below uses fewer components and only of standard type. The use of a high vacuum control valve provides greater reliability than the use of gas tetrodes.

## DESCRIPTION OF OPERATION.

Fig. 1 shows a simplified circuit diagram of a vacuum ionization gauge controller using a "hard" control valve. The mains voltage $E_1$ is applied to the primary of a transformer $T_1$. The secondary voltage $E_2$ of $T_1$ is applied to the parallel combination of the 6AS7G (one triode) and the primary of transformer $T_2$ via a series resistor $R_1$. The secondary of $T_2$ provides the filament supply for the AV26. A d.c. voltage of $E_b$ is applied to the series combination of one OD3, two OC3's and a ballast resistor $R_3$. The voltage $E_{d.c.}$ across the OD3 and OC3's provides a regulated voltage supply from which the grid voltage $E_e$ is obtained. $E_e$ is the difference between $E_{d.c.}$ and the voltage drop $E_4$ across $R_2$, caused by the grid current $I_e$. The grid voltage $E_c$ of the 6AS7G is the difference between $E_4$ and $E_3$, where $E_3$ is obtained from a voltage divided $R_4/R_5$. The ion collector voltage is obtained from a trap on $R_3$.

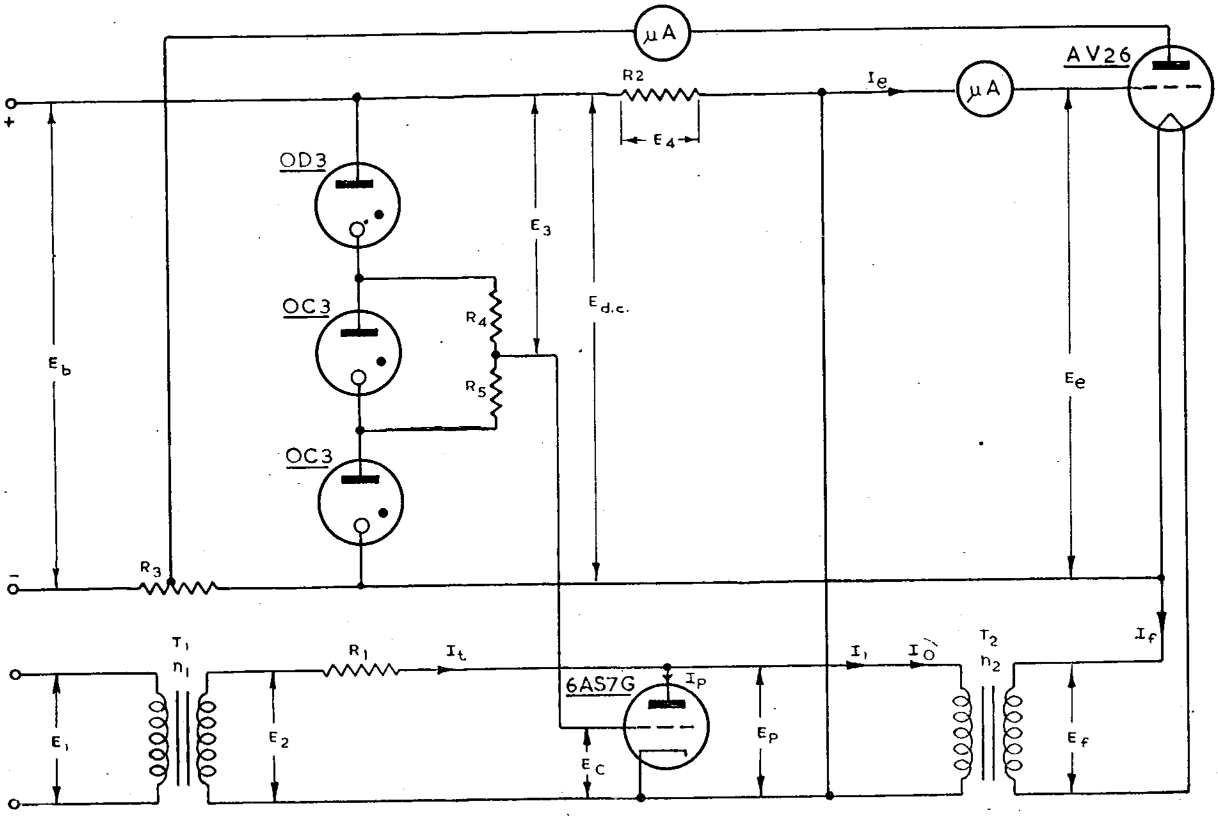



*Fig. 1. Simplified circuit of controller.*

Grid current ($I_e$) stabilization is realised as follows: If for any of the reasons mentioned in the previous paragraph $I_e$ increases, so $E_4$ and $E_c$ increase. Subsequently the plate current $I_p$ of the 6AS7G and the voltage drop across $R_1$ increase. This results in decreased primary and secondary voltages of $T_2$. Thus the original increase of $I_e$ is counteracted by a decrease in filament emission. Similarly a decrease of $I_e$ will be compensated for by an increase in filament emission.

## PRACTICAL CIRCUIT.

Fig. 2 shows the complete circuit diagram of a controller for a Radiotron AV26. The d.c. voltage supply is obtained from a standard receiver type power transformer of 385V a side with a Radiotron 5Y3GT full wave rectifier. This voltage is stabilized at 360V by the series combination of one OD3 and two OC3's. With the 16 μF input capacitor the percentage ripple is less than 0.25%. The 0.5MΩ resistor across the capacitor serves as a "bleeder" when the controller is switched off. The current through the voltage regulator valves is adjusted to 30 mA (with the AV26 disconnected) by means of the shorting tap on the 30,000 ohm ballast resistor. The ion collector voltage is adjusted to —40V by the second tap on the ballast resistor.

(a) **Low Pressure Range** (up to 1 micron ($10^{-3}$ mm Hg)). A 10,500Ω resistor is switched in series with the AV26 grid. If the grid current is adjusted to a constant 20 mA, the voltage drop across this resistor is then 210V and the grid voltage 150V.

(b) **High Pressure Range** (1 to 10 microns). A 105,000Ω resistor is switched in series with the AV26 grid. If the grid current is adjusted to a constant 2 mA, the voltage drop is again 210V and the grid voltage 150V.

A second bank of $S_2$ switches the grid current meter to either the 20 or the 2 mA range.

The cathode of the 6AS7G is at the same potential as the AV26 grid, i.e., + 150V relative to the AV26 filament. The grid potential of the 6AS7G is derived from the voltage divider across the centre OC3 and is + 135V relative to the AV26 filament. Therefore, the 6AS7G bias is —15V.

A third bank on $S_2$ switches additional resistance in series with the parallel combination of the 6AS7G and the primary of the filament transformer when in the 2 mA position.

If the AV26 is operating at $I_e = 20$ mA and switched to the 2 mA range without time lag, a temporary high current will flow through the grid current meter because of the heat inertia of the AV26 filament. To prevent damage to the meter an intermediate position has been included on $S_2$.

$S_1$ has 3 positions:

1. **De-gas.** The mains voltage is applied direct to the primary of the filament transformer while its secondary is connected to the grid terminals of the AV26.

2. **Stand by/Leakage.** The filament transformer is disconnected from both grid and filament. Any leakage from the AV26 ion collector to the grid or filament will be indicated by the ion collector current meter.

3. **Operate.** The primary of the filament transformer is connected to the plate and cathode of the 6AS7G and the secondary to the filament of the AV26.

The mains voltage is applied to the 240/280V transformer via a time delay of 45 seconds. If no time delay is incorporated an excessively high filament current will result during the warming-up time of the 6AS7G if $S_1$ is in the "operate" position.

The 750 ohm 100W resistor is adjusted for the 20 mA range and the 250 ohm 30W resistor for the 2 mA range. The 250 ohm rheostat serves as

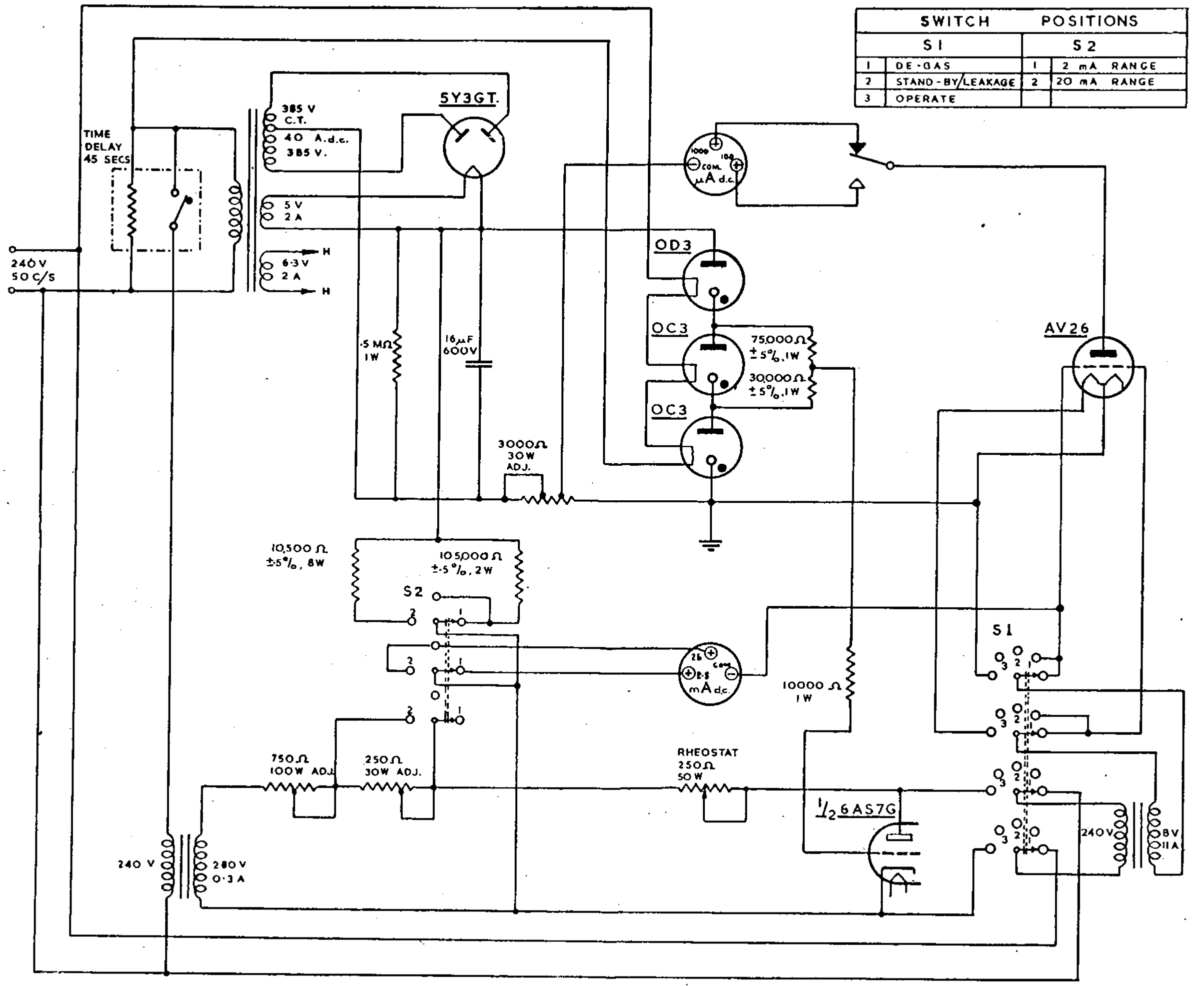



*Fig. 2. Complete circuit for ionization gauge controller.*

a fine control to compensate for different lengths of filament leads.

The ion collector current meter is normally switched to the 1000 $\mu$A range. By depressing the press button switch the meter is switched to the 100 $\mu$A range. This arrangement will protect the meter in case of high pressure or leakage.

## CONCLUSION.

A controller was built to the specifications shown in the appendix Over a mains voltage variation of $\pm$ 10% the grid current was observed to change by slightly less than $\pm$ 5%. This agrees with the theatrical value. This controller has operated very satisfactorily for some months in constant use.

## REFERENCE.

"Alimentation Stabilisée de Jauge à Ionisation pour Usage Industriel," by R. P. Henry, "Le Vide", 1956, No. 1, January/February, page 28.

# APPENDIX

## TABLE OF SYMBOLS:

$E_1$ = r.m.s. value of mains voltage.
$E_2$ = r.m.s. value of secondary voltage of $T_1$.
$E_p$ = r.m.s. value of plate voltage of 6AS7G.
= r.m.s. value of primary voltage of $T_2$.
$E_f$ = r.m.s. value of filament voltage of ionization gauge.
$E_e$ = d.c. grid voltage of ionization gauge.
$E_{d.c.}$ = regulated d.c. voltage of the power supply.
$E_c$ = $E_4 - E_3$ = d.c. grid voltage of 6AS7G.
$n_1$ = ratio of $T_1$ secondary/primary.
$n_2$ = ratio of $T_2$ secondary/primary.
$I_f$ = r.m.s. value of secondary current of $T_2$.
$I_o$ = r.m.s. value of no-load primary current of $T_2$.
$I_t$ = r.m.s. value of total primary current of 6AS7G.
$I_e$ = grid current of ionization gauge.

It can be shown that:—

Applying Kirchhoff's laws to Fig. 1

$$n_1 . E_1 = I_t . R_1 + n_2 . E_f \qquad (1)$$

If $E_1$ changes by $\Delta E_1$,

$$n_1 . \Delta E_1 = n_2 . \Delta E_f + R_1 . (\Delta I_p + \frac{\Delta I_f}{n_2}) \qquad (2)$$

If $E_p$ changes by $\Delta E_p$, the plate current of the 6AS7G will change by

$$\Delta I_p = \frac{n_2 . \Delta E_f + \mu . \Delta I_e . \dfrac{E_{d.c.} - E_e}{I_e}}{r_p} \qquad (3)$$

The rate of stabilization $s = \dfrac{\Delta I_e}{\Delta E_1}$.

The slope of the tangent of the $I_e/E_f$ characteristic of the ionization gauge at the operating point is $m = \Delta I_e / \Delta E_f$.
For all practical cases,

$$S = \frac{n_1 . I_t}{(n_1 . E_1 - n_2 . E_f)\left[\dfrac{n_2}{m . r_p} + g_m \dfrac{E_{d.c.} - E_e}{I_e}\right] + \dfrac{n_2}{m} . I_t} \qquad (4)$$

Now $E_1$ is fixed.

$E_c$ is determined by ionization gauge,

$E_f$, $I_e$, m are determined by the operating range of the ionization gauge,

$I_1$, $I_o$ and $n_2$ are known if the same transformer is used for degassing as well as filament supply.

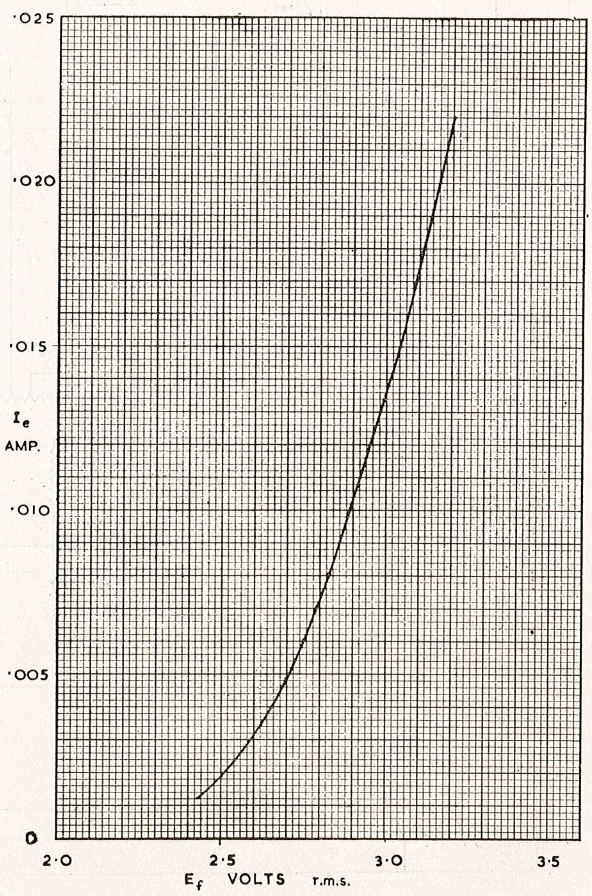



*Fig. 3. Grid current versus filament voltage characteristics.*

The control valve should operate at $E_p = n.E_f$ and should have a relatively high $g_m$ and low $r_p$. Rewriting Equation (4), it is found to have the general form:

$$E_{d.c.} = \frac{n_1 - c}{n_1.a - b}$$ and resembles an hyperbola of the form $xy = \text{constant}$.

By plotting the graph of the hyperbola, a suitable combination of $E_{d.c.}$ and $n_1$ can be obtained:

## APPLICATION TO THE PRACTICAL CIRCUIT.

For a mains voltage variation of $\pm$ 10% it is reasonable to specify a grid current variation of $\pm$ 5%. $E_1 = 240V$ r.m.s.

$\therefore S = 0.042 \times 10^{-3}$ A/V r.m.s.

From the data on the Radiotron AV26 (see Radiotronics, July, 1956),

$E_c = 150$ V; $E_f = 3.1$ V; $I_f = 4.7$ A.

From Fig. 3 ($I_e/E_f$ characteristic),

$m = 0.043$ A/V.

The same transformer is used for degassing and filament supply. To satisfy the former, a transformer with primary 240 V/secondary 8V/11A is required.

Thus $n_2 = 30$, $E_p = 93$ V, $I_1 = 0.157$ A.

Radiotron 6AS7G is a suitable control valve. Using a single triode at

$E_p = 93$ V, $E_c = -15$ V;

$I_p = 0.095$ A, $r_p = 550$ ohms, $g_m = 0.0038$ mhos.

Then $I_t = 0.27$ A (approx.).

Substituting

$$E_{d.c.} = \frac{285n_1 - 60}{n_1 - 0.388}$$ (plotted in Fig. 4)

A suitable combination is $E_{d.c.} = 360$ V and $n_1 = 1.15$.

Better stabilization can be obtained by several means. Considerations of economy will determine to what extent $E_{d.c.}$ and/or $n_1$ could be increased. By using two triodes in parallel, $r_p$ and $g_m$ together with $R_2$ can be increased. However, $I_p$ and $I_t$ will then increase entailing higher cost of $T_1$ and $R_1$. Another method would be the addition of an amplifier stage to increase the overall $g_m$.

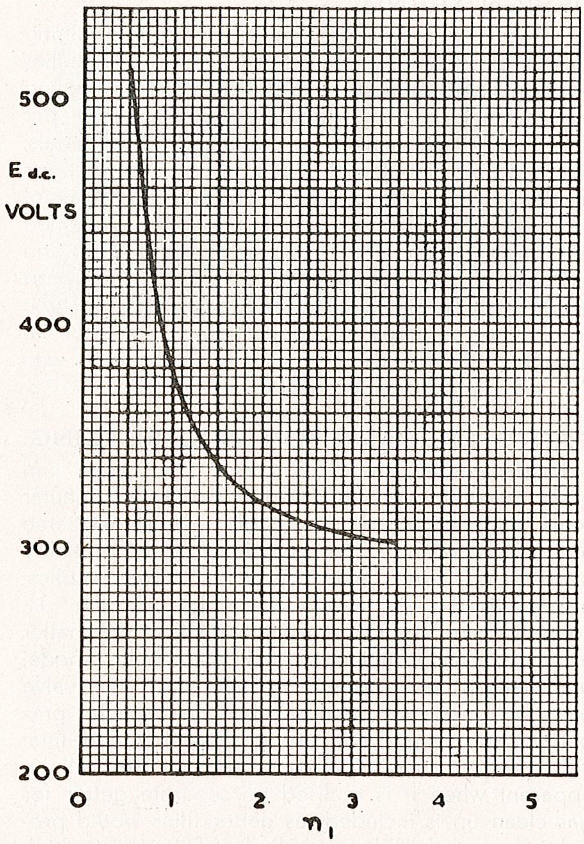



*Fig. 4. D.C. voltage supply versus transformer turns ratio.*

Johan Van der Goot, ing. received his Electrical Engineering Diploma from the Technical College (M.T.S.), Haarlem, Holland, in 1948.

Following his graduation he was employed by the Municipal Electricity Council of Leiden, being particularly concerned with the selectivity of protective devices for power distribution.

Since entering the Power Valve Section of the Amalgamated Wireless Valve Company Pty. Limited in February, 1951, Mr. Van der Goot has been responsible for the design and development of its test equipment. More recently he has been engaged on similar work for the TV Picture Tube section.

See also March '58 issue, P.35.



# SOME MODERN ASSEMBLY METHODS

By D. T. MILLER, A.S.T.C. (Engineer in Charge, Power Valve Section, A.W.V. Co.)

SUMMARY

Some of the main assembly operations performed in producing a typical power triode are described. Details are given of parts treatment, welding and brazing methods, valve exhaust and finishing. The importance of quality control is emphasised particularly in regard to selection of material to meet special requirements of valve operation.

Types of glass and metal seals designed to produce certain features, some operational tests and a note on power valve storage are discussed.

## DESIGN TREND.

To some degree large water cooled transmitting valves are being replaced by types of smaller physical size designed for use with forced air cooling and having greater power handling capacity per unit size. Improvements in selection of materials, operating efficiency and circuit design have been necessary to achieve these features. Typical of these new power tubes is Radiotron 5762, designed for use in TV and Radio Broadcast transmitters and industrial services, capable of delivering 4 kilowatts power output at 220 Mc/s. Modern power tube construction requires the application of some special assembly techniques not usually associated with the mass produced product.

## PARTS PREPARATION AND SEALING.

Fundamentally, the 5762 triode is of glass and metal construction embodying a variety of annular seals and employing a double helical thoriated tungsten filament. The complete valve assembly consists of three main parts or sub-assemblies, header, grid, and anode assembly (see Fig. 1). These in turn are made from a number of smaller elements such as filament, grid, glass bulb, anode, seal flanges, etc. Materials from which the valve parts are made are selected for their special properties with regard to ease of assembly and final valve performance. The importance of this will be apparent when it is realised no separate getter for gas clean up is included, as getter films would provide unwanted leakage paths and losses at high frequency operation. Spun and drawn metal parts are subjected to a thorough chemical cleaning and hydrogen firing before assembly.

## GRID ASSEMBLY.

The grid assembly comprises a spun copper cone, heat reflector shield, and circular grid wound from platinum clad molybdenum to inhibit grid emission (see Fig. 1). After winding, the grid side rods and lateral wire are resistance welded using a copper roller and the mandrel itself as electrodes. Finally, the parts are assembled with solder rings and the grid is r-f brazed in vacuo into the apex of the cone.

## FILAMENT HEADER ASSEMBLY.

The steel header, carrying three insulated filament terminals forms part of the external grid connection. Filament lead assemblies which mainly consist of glass-to-metal disc seals are brazed using r-f induction heater into the header with silver eutectic solder in a hydrogen atmosphere. Arc welding is employed to weld the filament and its supporting leads to the header assembly, also in a reducing atmosphere.

In order to prevent serious filament distortion taking place during service, the filament is flashed in hydrogen by passage of a current for several short periods, at a temperature higher than its

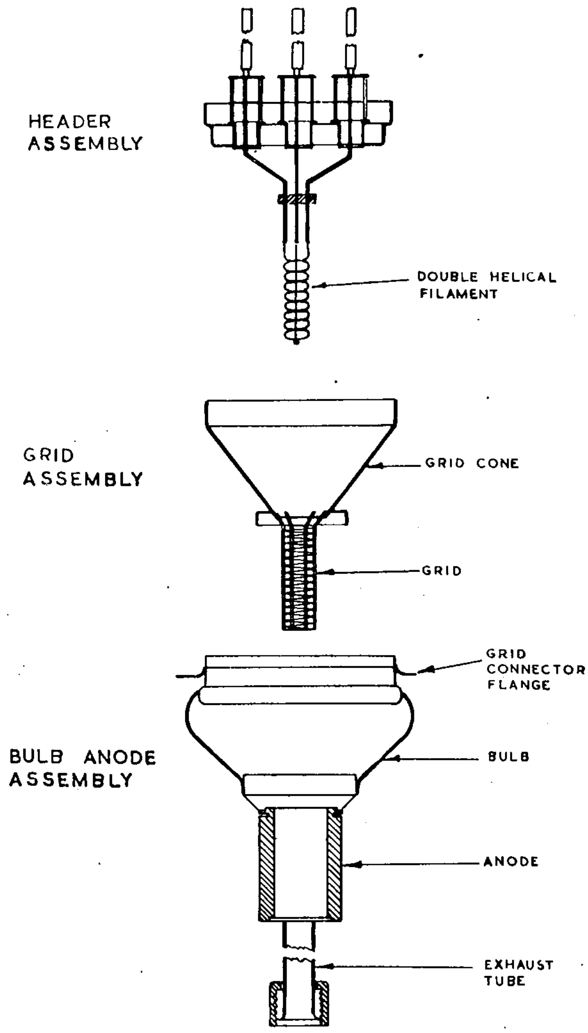



*Fig. 1. Header, bulb-anode and grid cone assemblies.*

normal operating temperature of approximately 2000°C. Between flashing steps the assembly is removed from the flashing bell for filament straightening. The filament, being very brittle, is heated to a dull red temperature by application of a low voltage. Any sagged or displaced turns are then moved back into position with tweezers. When no further displacement of turns is observed after flashing, the assembly is ready for the next operation of carburising. This involves flashing in a hydro-carbon gas mixture to form a tungsten carbide layer on the surface of the wire. The presence of the carbide enhances thermionic emission and greatly increases life at normal filament operating temperature.

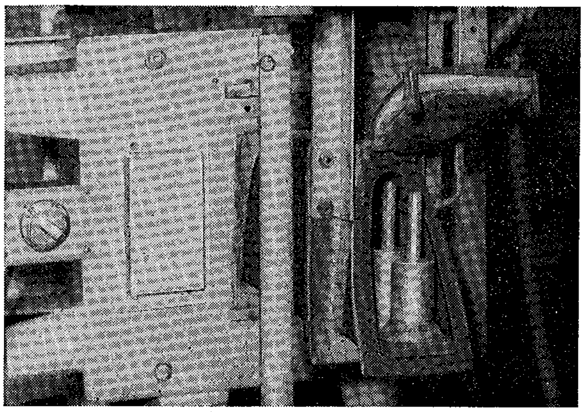


*Fig. 2. Anode assembly brazing. Parts are placed into a muffle, flushed with hydrogen and inserted into furnace.*

## BULB-ANODE ASSEMBLY.

A combination of annular seals is used to fabricate the bulb anode assembly, comprising copper anode. exhaust tube, glass bulb and grid connector flange. The anode, exhaust tube and kovar seal flange are mounted on stainless steel jigs with solder rings and hydrogen fired in an electric furnace (see Fig. 2). Grid connector flange and seal ring are treated in a similar manner and the two sub-assemblies joined by a glass bulb in the glass sealing lathe (see Fig. 3).

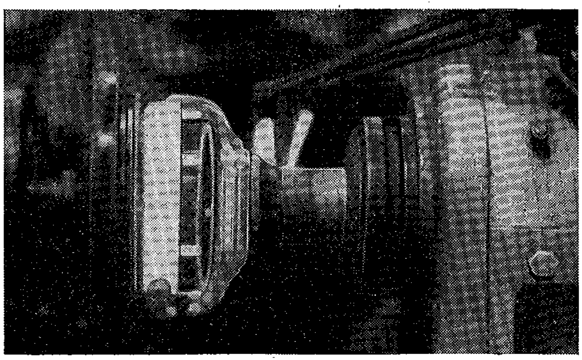


*Fig. 3. Bulb anode sealing operation (lathe).*

## FINAL ASSEMBLY (MAIN SEAL).

The complete mount (grid cone and header assembly) and bulb anode assembly are carefully aligned in a glass sealing lathe (see Fig. 4), brought together and tacked with an oxy-acetylene flame in preparation for the final seal. Special care is taken in the line-up operation to ensure characteristics remaining within specified tolerances, particularly the cut-off grid voltage.

The final oxy-acetylene flame weld is performed with the valve mounted vertically and rotating (see Fig. 5). The rim formed by the steel header and grid seal flange is welded, the valve being flushed with hydrogen to prevent oxidation.

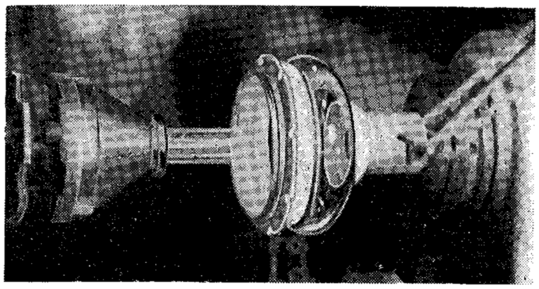


*Fig. 4. Mount, anode line up (lathe).*

## DEGASSING THE VALVE.

A conventional vacuum pumping system employing a three stage oil diffusion pump backed by a mechanical pump is used for exhaust, a process which takes approximately 7 hours. The valve is connected to a metal manifold by means of a steel fitting on the flanged end of the exhaust tube and screwed to the manifold port with a torque spanner (see Fig. 6). The exhaust cycle commences with an oven bakeout, followed by filament flashing, grid bombard and anode degassing, during which the anode temperature is raised to red heat for a prolonged period. Glass to metal seals are cooled with controlled air jets to prevent fracture.

A pair of asbestos wrapped valves being exhausted is shown in the illustration. Asbestos is used to help maintain at a sufficiently high temperature, parts which are difficult to degas.

The entire process is monitored by gas pressure readings with the aid of an ionization gauge. At the conclusion of exhaust treatment the valve is finally sealed off by a pair of hydraulically operated steel rollers which squeeze the copper exhaust tube making in effect a cold weld. An air cooled radiator is then soldered to the anode and flexible leads are attached to the filament terminals.

## VALVE AGING, TESTING.

As this valve is designed for high frequency operation it is necessary to provide a good conductive coating to avoid skin effects and local overheating due to high circulating currents. All oxide films and solder flux are removed from the metal surfaces, which are then sprayed with a conductive coating of silver lacquer. Use of acids at this stage for cleaning must be avoided as penetration of ionised hydrogen gas evolved through steel sections will make the valve gassy. Further it has been demonstrated that, for the same reason, valves become gassy if electro-plating instead of lacquer is used in the finishing process.

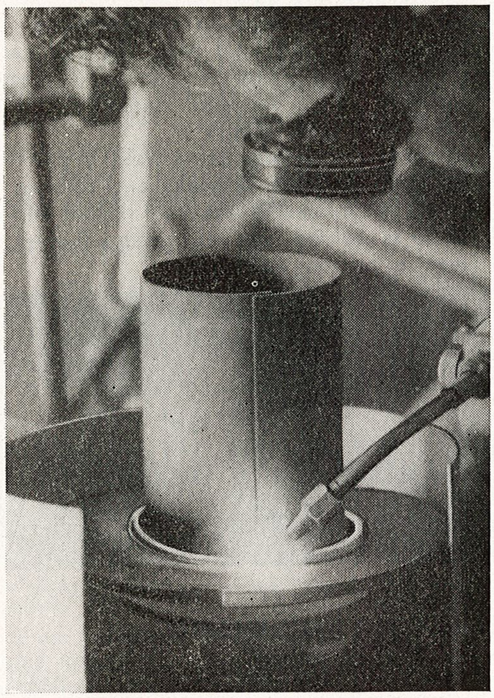


*Fig. 5. Final oxy-acetlyene weld.*

Risk of internal arcing during operation is considerably reduced by "spot knocking" the valve elements. A high voltage (approximately 40 KV peak) is applied for several minutes to remove points of leakage or high potential gradient. Before any testing is done the valve is aged by running under certain conditions to activate the filament and raise the emission level and also clean up any residual gas not removed at exhaust. The valve is then tested for power output in a 110 Mc/s coaxial line oscillator operating into a water load. This is followed by static tests for gas, filament current, grid voltage, amplification factor and peak emission.

## INSPECTION AND QUALITY CONTROL.

A high degree of inspection criteria must be maintained throughout the various assembly operations during manufacture, especially in regard to

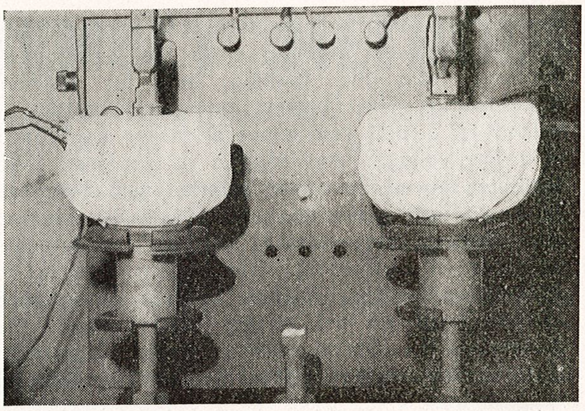


*Fig. 6. Valves under exhaust.*

dimensional tolerances, cleanliness and seal quality. There are twenty-seven vacuum seals in type 5762 which necessitate close control of sealing and brazing procedure to avoid risks of slow air leaks through imperfect seals.

In the choice of materials, copper parts such as anode, grid support cone and exhaust tube must be fabricated from high quality, oxygen free, high conductivity material. Metal parts are usually fired in a hydrogen furnace. When electrolytic copper is fired, any oxide inclusions are reduced, forming steam, which may fracture the crystal boundaries, thus providing a course of gas — or in the worst cases, air leaks.

All other valve materials must have a very high degree of purity. For example, brazing solder should conform to a rigid specification excluding well-known contaminations like sulphur and phosphorus.

Internal metal surfaces in the vicinity of glass seals are copper plated for good electrical conductivity to prevent the seals becoming overheated.

## OPERATION AND STORAGE.

Complete details of installation and application of type 5762 are given elsewhere. However, the importance of adequate cooling cannot be over emphasised. Maximum temperature of bulb, filament, grid and plate seals should not exceed 180°C.

It is to the advantage of transmitter operators to test spare valves regularly, say every six months, to keep in touch with their condition during storage. Large power valves should be selected for service if possible, in rotation, according to period of storage.

Mr. D. T. Miller joined the staff of A.W.V. Pty. Ltd. in 1937 as a trainee engineer and has had general experience in engineering problems associated with both transmitting and receiving valve production. During the war he headed a group manufacturing microwave silicon crystal detectors. Later he became engaged on the analysis of factory glass problems and on the development and control of sealing techniques and other glass processes. He then joined the Power Valve Section engineering group and is now engineer in charge of the technical and production activities of the section.

# TECHNICAL LIBRARY

## "HIGH FIDELITY"

By G. A. BRIGGS. First Edition: May, 1956.

(Published by the Wharfedale Wireless Works Ltd.)

This book is sub-titled "The Why and How for Amateurs", and thus its purpose is adequately described. It is written in a particularly lucid style which makes the volume a pleasure to study. Mr. Briggs himself realized the necessity to combine expression of principles, full explanation with simplicity of text. "It is always extremely difficult to write in plain language on technical subjects, and many highly qualified engineers are not without a lack of talent in this direction."

All aspects of high fidelity are covered in this book — Pickups, Tone Arms, Turntables, Amplifiers, Tuners, Loudspeakers, Cabinets, Tape Recorders — together with a number of chapters on allied subjects such as Stereophonics, Record and Stylus Wear, and Room Accoustics.

The chapter on Amplifiers has largely been taken from an earlier publication —"Amplifiers"— now out-of-print. As with other chapters, the subject matter is covered in a non-mathematical treatment, while at the same time conveying a knowledge of the characteristics of amplifiers. An interesting section is the debunking of the arguments on "Triodes versus Pentodes"!!

This book is heartily recommended to the high fidelity enthusiasts who wish to assess the merits of sound reproduction equipment.

Radiotronics readers will note with interest the number of occasions on which reference is made to the Radiotron Designer's Handbook.

## "LOUDSPEAKERS"

By G. A. BRIGGS. Fourth Edition; latest impression, August, 1956.

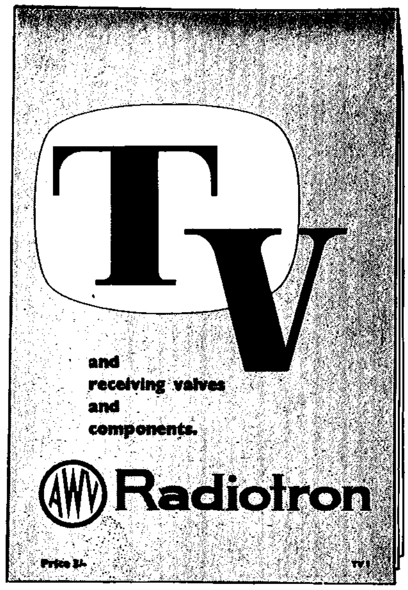
(Published by the Wharfedale Wireless Works Ltd.)

The main title of this 90 page booklet is somewhat of a misnomer. The text covers a rather wider, though closely allied, field. The first half covers Loudspeakers in such sections as Magnet, Cone Housing, Cones, Centring Devices, Impedance, Phase and Decibles, Frequency Response, and Resonance.

Then the application of loudspeakers is discussed — Cabinets and Baffles, Extension Speakers, Cinema Speakers, Room Accoustics, Crossover Networks and Loudspeaker Life.

The book covers generally the range of its subtitle, "The Why and How of Good Reproduction". It falls short in some chapters, such as that on Cabinets and Baffles. This subject, however, is fully discussed in another book, "Sound Reproduction", by the same author.

Copies of both of the above books were made available by the courtesy of Wharfedale Wireless Works Ltd., England.




## TV AND RECEIVING VALVES AND COMPONENTS

(Published by the Wireless press for Amalgamated Wireless Valve Co. Pty. Limited)

This month we find another valuable addition to the already extensive Radiotron technical library. The booklet TV-1 gives a comprehensive coverage of Radiotron Television valves and components.

Television servicemen will find this book a definite must because of its explicit diagrams and easy-to-follow circuits. This 23 page booklet is divided into two sections.

In the first section you will find Socket Connections, Electrical data, Photographs and General descriptions of the complete Radiotron TV valve range.

The second section contains simplified Schematics, Electrical data, Terminal connections, Photographs and General information on the Radiotron TV compononents.

Also contained in this booklet are the Socket connections, Electrical data, Maximum ratings, Typical operating conditions and general information on the Radiotron 17HP4B Picture Tube.

A further point worthy of mention is that this booklet has been prepared in a loose form to allow for the addition of future data sheets. These sheets will be advertised regularly in "Radiotronics" and will be available free of charge, on request.

# VIDEO I-F AMPLIFIER

There are a number of corrections which should be noted in the article published in "Radiotronics", December, 1956. The corrected lines are:—

**Page 155** — foot of column 1:

left entirely to the manufacturer. A 6 db bandwidth

**Page 156 — Input Circuit** (paragraph 2):

The inductances $L_1$ and $L_2$ with their associated capacitances form the adjacent channel sound and vision traps, and the coil $L_3$ is part of a pi-matching network.

**Page 157 — Spot Frequencies** (end of first paragraph):

keeping the detector output level at about 2 to 3 volts:—

**Page 158:**

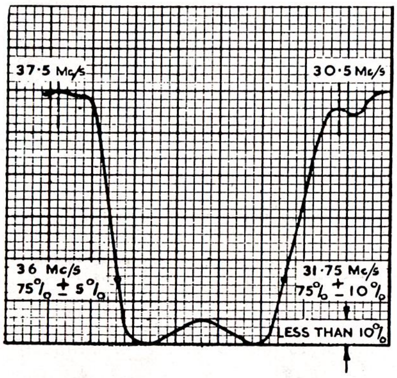



*Fig. 7. Link Circuit Response.*

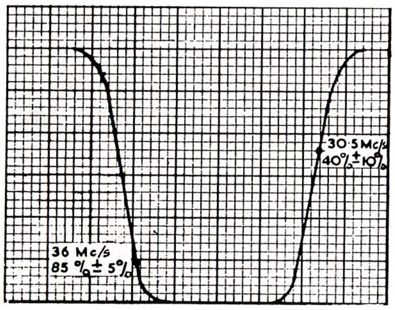


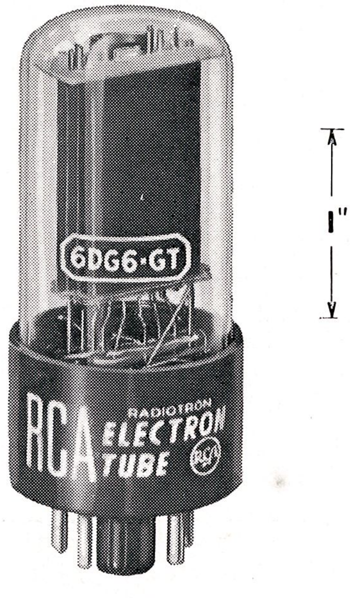

*Fig. 8. $T_4$ Response.*

Labels interchange.

# NEW RCA RELEASES

## RADIOTRON 6DG6GT
### BEAM POWER VALVE

The 6DG6GT is a beam power valve of the glass-octal type designed primarily for service as an output valve in audio amplifier applications. Having a 6.3 volt/1.2 ampere heater and a maximum peak heater-cathode voltage of ± 90 volts, but otherwise like the popular 25L6GT, the 6DG6GT is intended especially for use in audio equipment requiring a valve having high power sensitivity and high efficiency at relatively low plate and grid No. 2 voltages.




For example, in class A1 audio-amplifier service, a single 6DG6GT operating at a plate voltage of 200 volts and a grid No. 2 voltage of 125 volts, will deliver 3.8 watts of audio power with a peak a-f grid No. 1 voltage of only 8.5 volts.

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