EDDYSTONE RADIO

DATA SHEET
No. **D.S.124**
(SEPTEMBER, 1959)

GEARED SLOW-MOTION DRIVE ASSEMBLY

Cat. No. 898

A high grade assembly designed for instrument applications. The movement is gear-driven and flywheel loaded, giving a smooth, positive drive, with a reduction ratio of 110 to 1.

The pointer has a horizontal travel of 7 inches. A circular vernier scale, marked over 100 divisions, rotates five times for one traverse of the pointer, and, read with the " 100 " scale on the dial, provides a total of 500 divisions. The dial has five lines to take calibration markings.

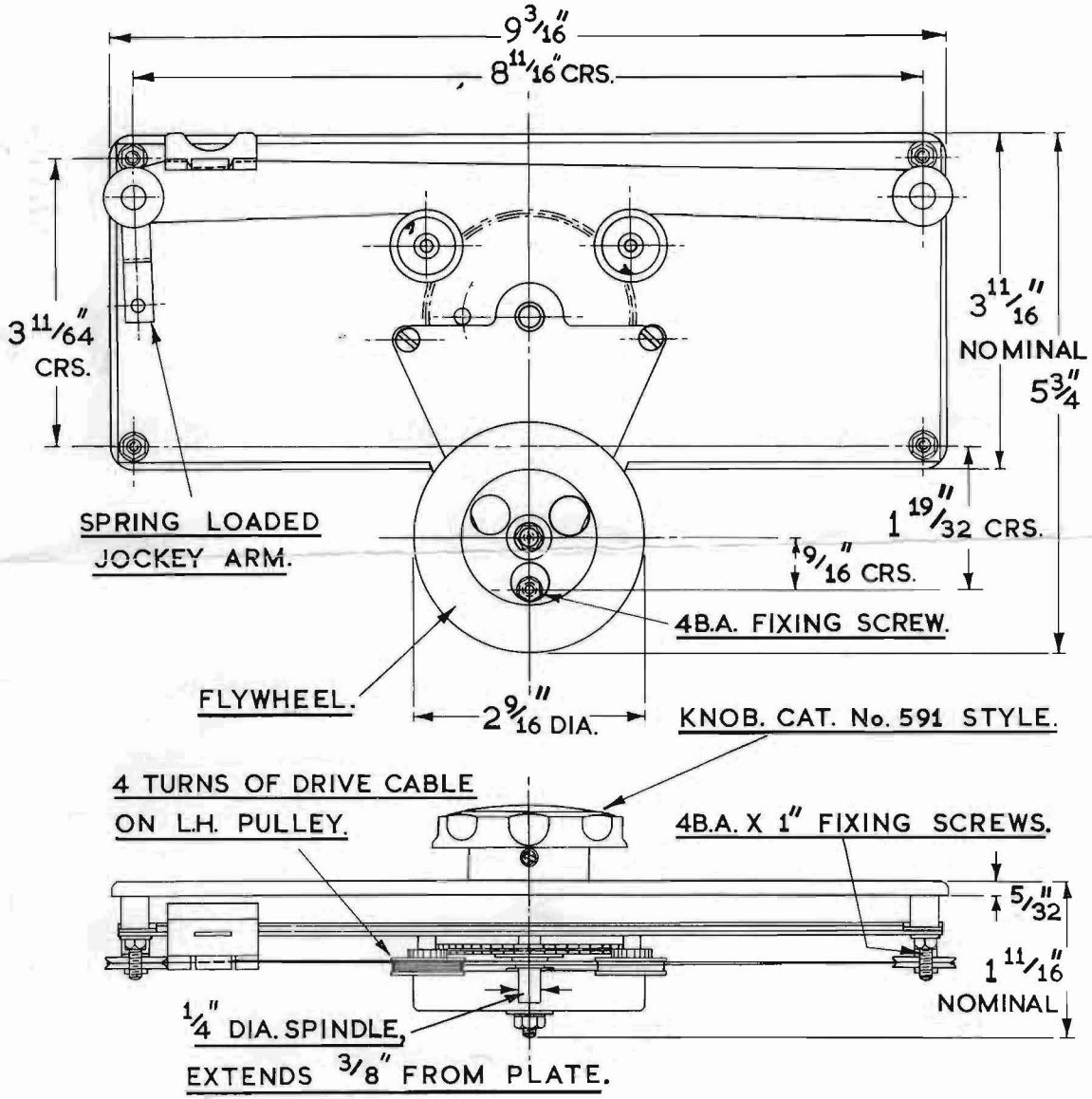
A diecast escutcheon, finished glossy black, is supplied and the assembly is complete with perspex window, knob, fixing screws, and mounting template. It is suitable for mounting on metal or wooden panels up to 7 mm. thick. Overall external dimensions are $9\frac{3}{16}$" (23·34 cms.) by $5\frac{3}{4}$" (14·6 cms.). Weight is approximately 1 lb. 14 ozs. (·85 kilogrammes).

J 959 Printed in England

STRATTON & CO., LTD.
EDDYSTONE WORKS : BIRMINGHAM 31 : ENGLAND
TELEPHONE: PRIORY 2231-4 TELEGRAMS: STRATNOID, BIRMINGHAM

SLOW MOTION GEAR-DRIVE ASSEMBLY

Cat. No. 898



"DAWN" ALL STEEL HAND WINCHES

Because of their adaptability, and lightness combined with strength, these powerful little hand winches are particularly suited to the requirements of Builders, Contractors, Structural and Industrial Engineers, and in factories, warehouses, storeyards, etc.

For Carriers and Hauliers of medium and heavy goods, machinery, logs, etc., the compact design (a 5-ton unit can be comfortably carried in the luggage boot of an ordinary car) permits the winch to be bolted to the tray of a truck as a permanent part of the equipment.

Bolted to a post or frame in any convenient position, with the line passing through overhead blocks, the "Dawn" All-Steel Winch can be used to advantage in place of the slow, cumbersome chain block, providing more headroom, keeping the operator clear of the load, and saving time because of the quick change from low to high gear ratio.

For general utility in lifting and shifting, the adaptability of this handful of power is only limited by the ingenuity of the operator. For lighter lifts the crank pinion and shaft (which are one steel casting) is inserted in the tooth shaped socket in the centre of the large gear wheel providing a 4 to 1 ratio, whilst for heavier work the pinion is positioned as in the illustration, where it is positively held by a spring-loaded plunger.

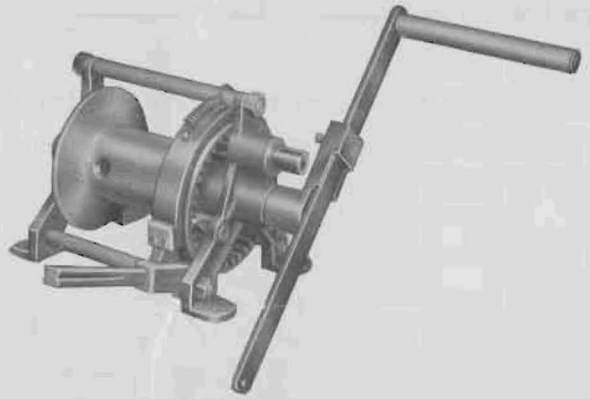
The steel tail yoke can be quickly attached to either end to provide anchorage for outdoor or field service work.

The standard specifications for the 2-ton and the 5-ton sizes are:

	2 tons	**5 tons**
Straight line capacity. Approx. dimensions, excluding handle	15″ x 13″ x 11″	20″ x 17″ x 15″
Length of drum	8″	10″
Steel wire rope capacity	120′—$\frac{3}{8}$″ dia.	250′—$\frac{1}{2}$″ dia.
High gear ratio	4 to 1	4.3 to 1
Low gear ratio	22 to 1	24 to 1
Weight	78 lbs.	140 lbs.

If required, special long drum winches can be supplied.

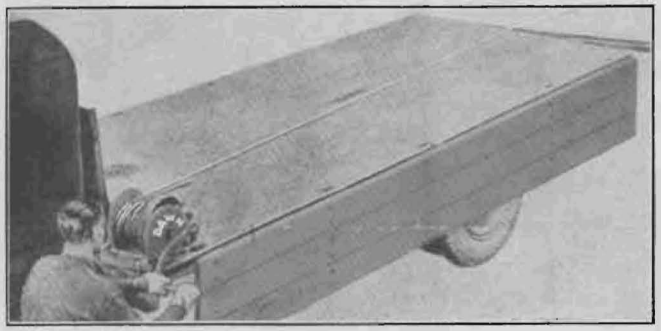
"DAWN" ½ TON ALL STEEL HAND WINCH



Two speeds—high is direct on to the drum shaft, and the low gear ratio is 4.2 to 1.

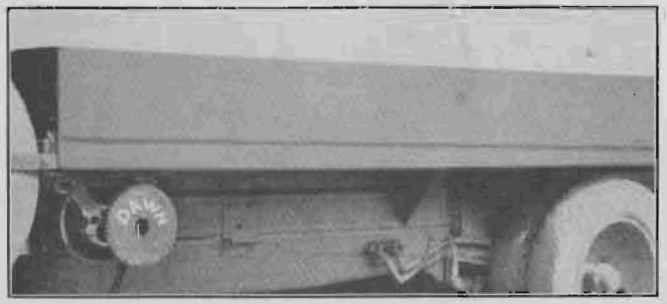
This little light duty winch has accurately fitting white metal bearings, fabric lined brake, safety pawl and adjustable handle.

Approx. dimensions (less handle)	12″ x 9″ x 9″
Length of drum	6″
Steel wire rope capacity	80′—$\frac{1}{4}$″ dia.
Weight	40 lbs.

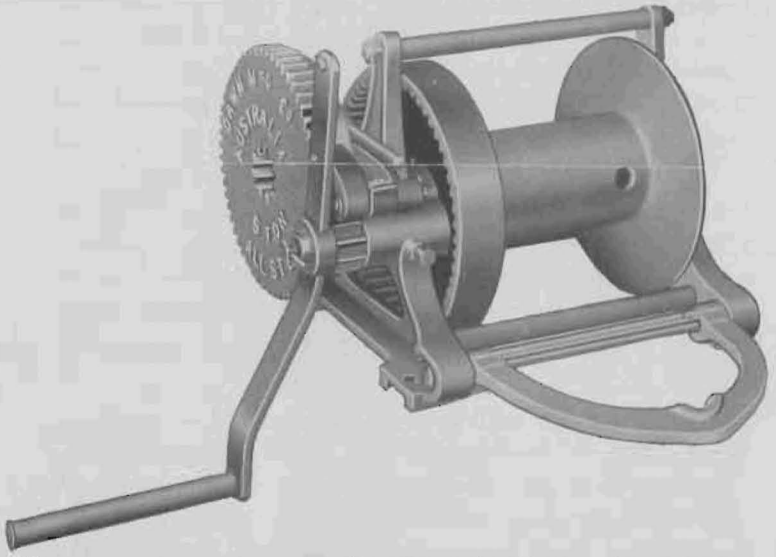


These illustrations show two applications of the "Dawn" All Steel Winch as permanent truck equipment.

In the second picture where the winch is bolted upside down under the tray, the cable is passed through a hole and over a roller.



STURDY POWERFUL LIGHT COMPACT SPEEDY SAFE



"DAWN" ALL STEEL HAND WINCHES

Constructed throughout of high grade electric cast steel and designed without keys or set screws to shear or strip; therefore practically indestructible.

Generously proportioned anti-friction white metal bearings, internal fabric lined brake, safety pawl and adjustable handle.

Made in Australia by

THE DAWN MANUFACTURING COY. PTY. LTD.

SHEPPARD STREET, NORTH COBURG, VICTORIA

Obtainable from:— R. N. JACKSON PTY. LTD.
MACHINERY MERCHANTS
CNR. COLLINS STREET & MARKET PLACE
HOBART
BOX 983 B PHONE B3159

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Reliable "Dawn" Products

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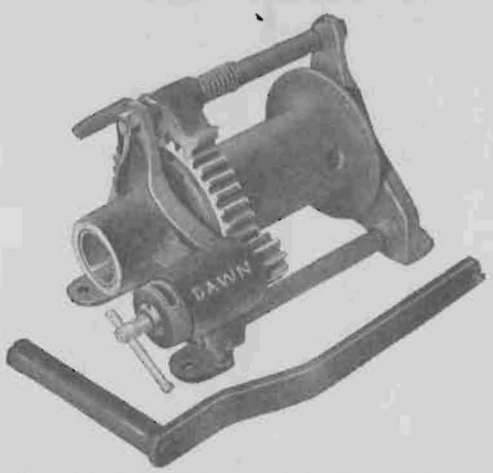

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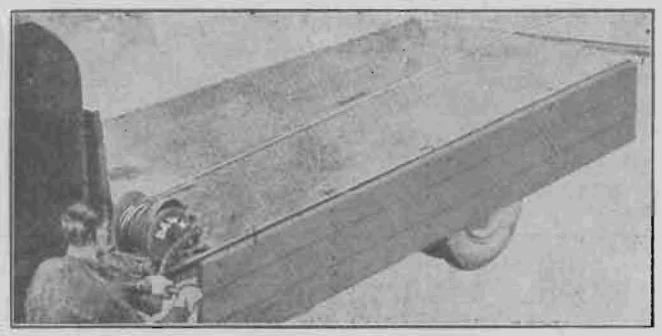

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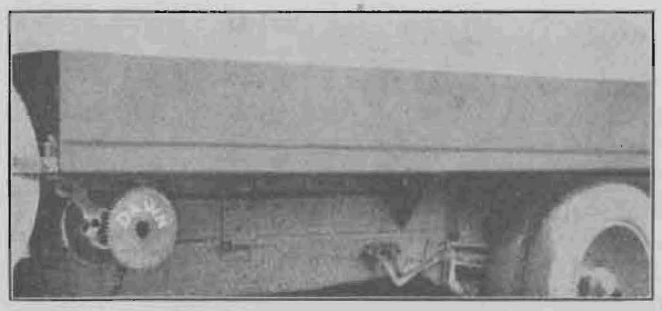

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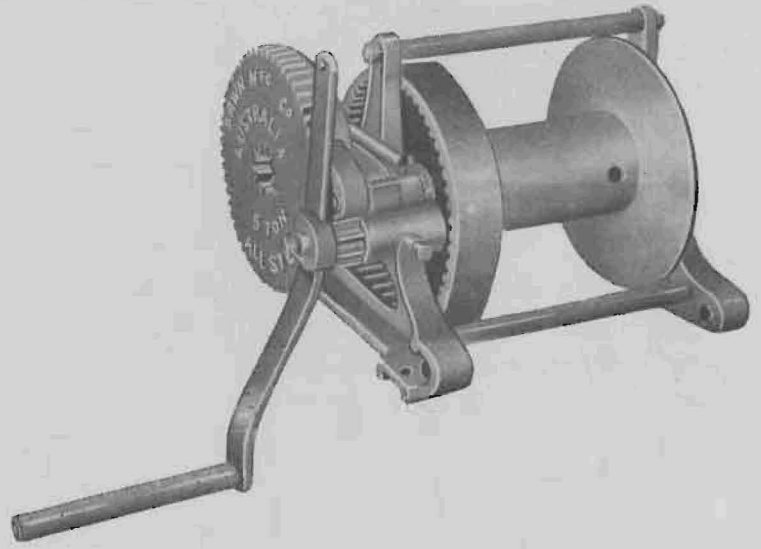

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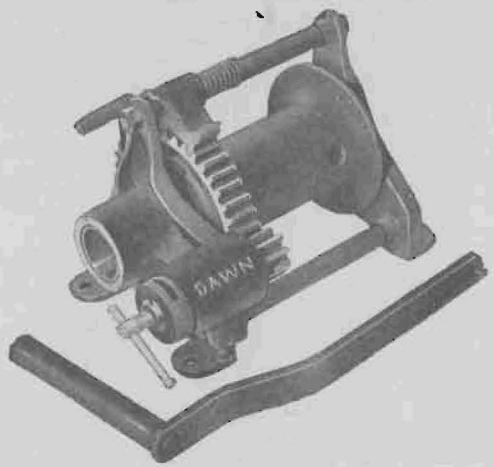

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BALLAST-REGULATING TUBE

AMPERITE

AMPERITE BALLAST-REGULATING TUBE

WHAT IT IS

Amperite is an automatic *"rheostat"* designed to keep the current in a circuit at a definite value, for example, 0.5 amps. Should the supply voltage increase, the *Amperite* will automatically increase in resistance enough to take up the increase in supply voltage — keeping the voltage on the load constant (Fig. 1). It consists of an iron wire *hermetically sealed* in a bulb containing *hydrogen* or *helium* — the two gases with the *highest heat conductivity*. Its regulating action is based on the high temperature co-efficient of resistance of the iron wire and the rapid cooling of *hydrogen* or *helium* gas.

CONTROLS FIXED LOAD ONLY

Being a constant current device, the *Amperite* can be used only to regulate a constant load — fixed wattage. An exception is the voltage control of the water wheel generator shown in *Fig. 5* — where the *Amperite* is used in parallel with the series field.

Thermostatic relays can sometimes be included in an *Amperite Ballast Tube* to reduce initial surge.

CAPACITIES AVAILABLE:

Current values of 60 ma. to 5 amps.

Threshold voltage *(see Fig. 3)* 0.4 to 40 V

Max. dissipation per *Amperite* 60 W per tube (ST19 Bulb)

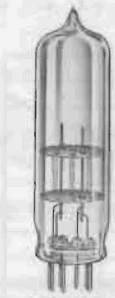
Amperite can be used on AC, DC, or pulsating current.

Ballast tubes should not be operated in series.

Any number of *Amperites* with the same voltage range can be operated in parallel.

BASES AVAILABLE and BASE WIRING:

Radio octal—7 pin miniature—9 pin miniature—
standard wiring prongs 2-7.
4 Prong Radio—for current over **3** amps.—wiring FF.



MINIATURE UNIT

Only ¾" x 2⅝" overall. Ideal where efficient space-saving Regulators are required.

GENERAL ADVANTAGES

- *Light, compact*
- *No moving parts*
- *Rugged; will stand vibration of 10G. minimum*
- *Hermetically sealed; not affected by altitude or humidity changes*
- *Can be changed as easily as a radio tube*
- *Operates equally well on A.C. or D.C.*
- *Inexpensive*

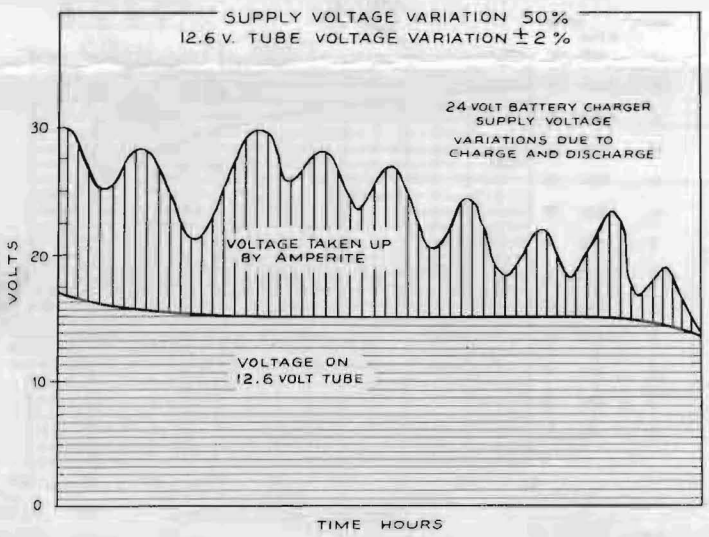


FIG. 1—The voltage fluctuations of a battery-charger system can be smoothed out as shown.

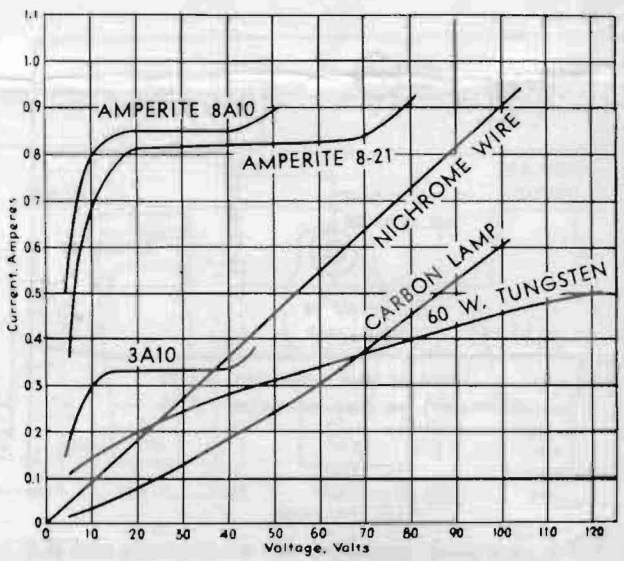


FIG. 2—Showing far superior regulating characteristics of the *Amperite* Ballast-Regulating Tube.

BALLAST-REGULATING TUBE

AMBIENT EFFECTS:

Ambient temperature variation of −50° to +70°C — will change the current value of an *Amperite* approximately 2% on regulating portion of curve *(Fig. 6)*. Being hermetically sealed the *Amperite* is not affected by altitude or humidity changes.

TIME LAG CHARACTERISTICS:

Time lag encountered in an *Amperite Ballast Tube* depends upon the wattage consumed by the ballast and the size of the bulb. Where the wattage is small for the size of the bulb, the action can be made practically instantaneous — less than 1 second. In such cases the bulb will remain at practically ambient temperature. When the wattage is high enough to heat the bulb to a temperature uncomfortable to the hand (160°F) the lag might be as much as several minutes for final readings—but normally reaches within 10% of final readings within a few seconds.

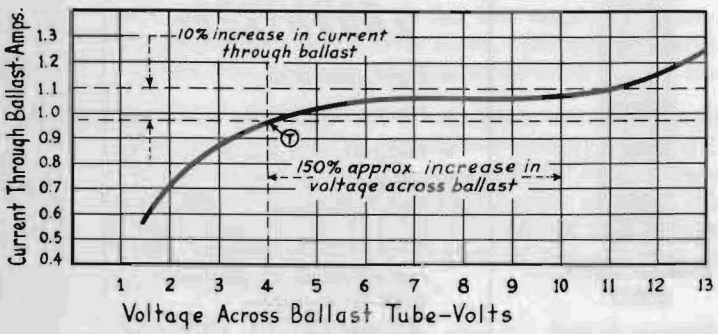


FIG. 3—Characteristic curve of a typical *Amperite*. Approximate curve of any other *Amperite* can be obtained by multiplying or dividing the current or voltage scale by any number.

LIFE EXPECTANCY:

Average life if operated as recommended	2000 Hours
If operated continuously at maximum voltage	1000 Hours
If operated continuously at 80% maximum voltage	5000 Hours
If filament is operated below glow point	5000 Hours up

In operation, the *Amperite* filament starts to glow at one point; as the voltage is increased, the glow spreads over the entire filament. Like incandescent lamps, turning *Amperite* on and off reduces its life, especially if operating near its maximum voltage.

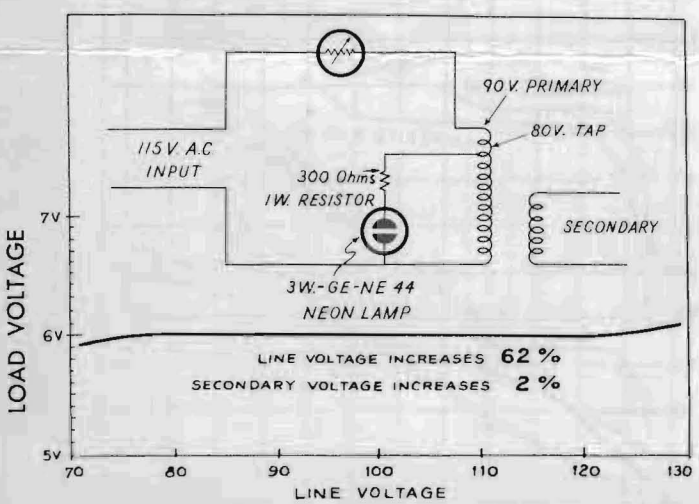


FIG. 4—For very close regulation, use an *Amperite* and G.E. 3W—NE-44 Neon Lamp, 4 Prong Radio Base. Base wiring 1 and 2. This G.E. lamp is available from *AMPERITE* CO.

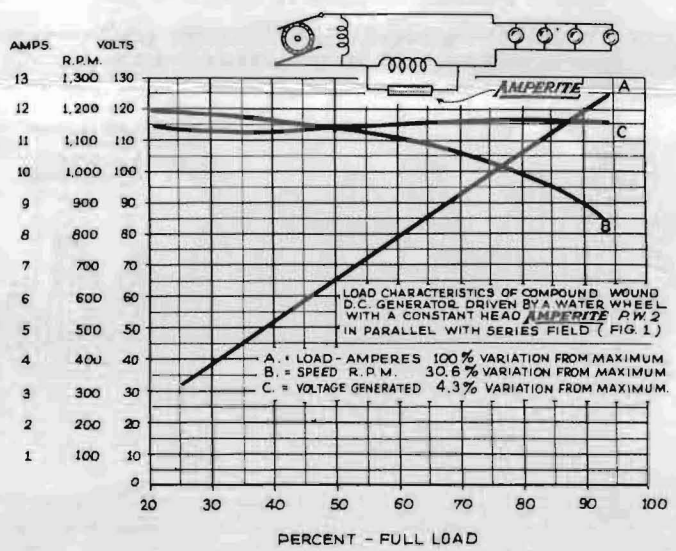


FIG. 5—Excellent regulation of generator is obtained with an *Amperite* in parallel with series field.

BALLAST-REGULATING TUBE

DELAY ACTION

DELAY RELAY ACTION WITH AN *AMPERITE* BALLAST TUBE — AND MAGNETIC RELAY

By shunting the proper *Amperite* across the coil of an ordinary relay, a delay action relay of a fraction of a second to 3 seconds is obtainable. When the actuating current is first applied the *Amperite* acts as low resistance by-pass. The current causes the *Amperite* resistance to rise — increasing the voltage across it until the operating voltage of the relay is reached. The *Amperite* must be carefully matched by us to the relay type used. A dropping resistor must be used in series with relay — consuming at least half the voltage. An *Amperite* operating in this way will stand up for millions of operations — and can be made to recycle in approximately 2 seconds.

BATTERY CHARGING AND DISCHARGING

Amperite Ballast Tubes are very successfully used for keeping the current constant in charging and discharging batteries. Any number of *Amperites* of the same voltage range can be placed in parallel in order to obtain the proper current. The current can be kept to ± 1%. Advise voltage variation and currents desired.

AMPERITE NUMBERING SYSTEM

In general the *Amperite* number denotes the current-voltage threshold value *(Fig. 3)*. The system of course is only approximate and does not give the exact value. For example:

AMPERITE NUMBER	3-4	3H4	10-7	12-11	12H11
THRESHOLD CURRENT (a)	0.3	0.35	1.0	1.2	1.25
THRESHOLD VOLTAGE (V)	4.0	4.0	7.0	11.0	11.0

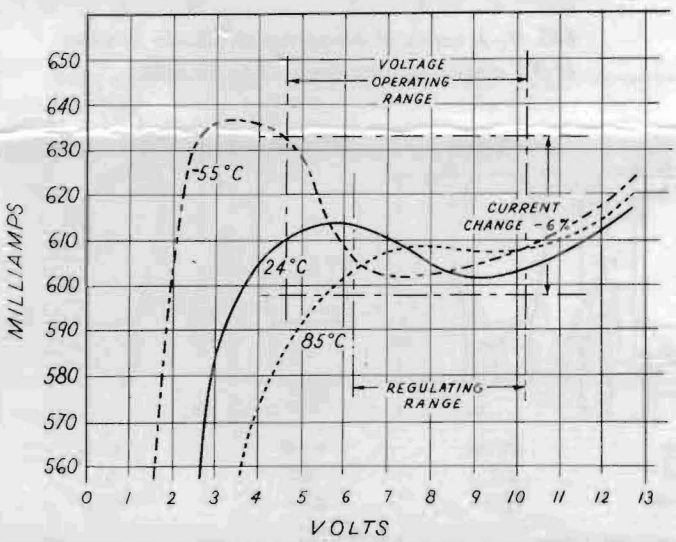


FIG.. 6—Amperite Ballast-Type 6-4 current voltage characteristic under ambient conditions of —55°, 24°, and 85°C. The percentage change with ambient is approximately the same with all type *Amperite* ballasts.

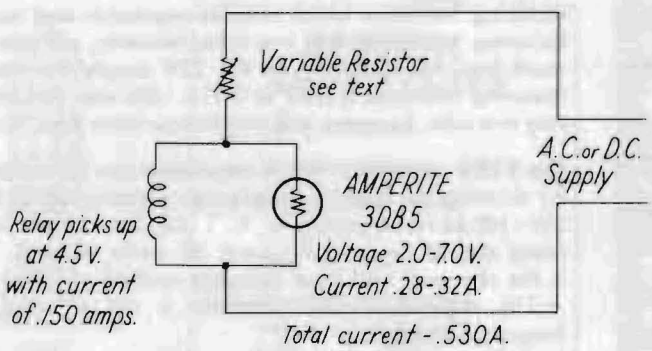


FIG. 7—Amperite Ballast Tube 3DB5 used to delay action of magnetic relay. Delays from 0 to 3 seconds obtainable. For 12 volt supply use 20 ohm rheostat; for 26 volt supply use 50 ohm rheostat. A constant delay of 2 seconds, plus or minus 1 second, is obtainable from a 24-32 volt supply using an *Amperite* Type 5-9SP ballast tube and a 20 ohm fixed resistor in place of the variable resistor shown.

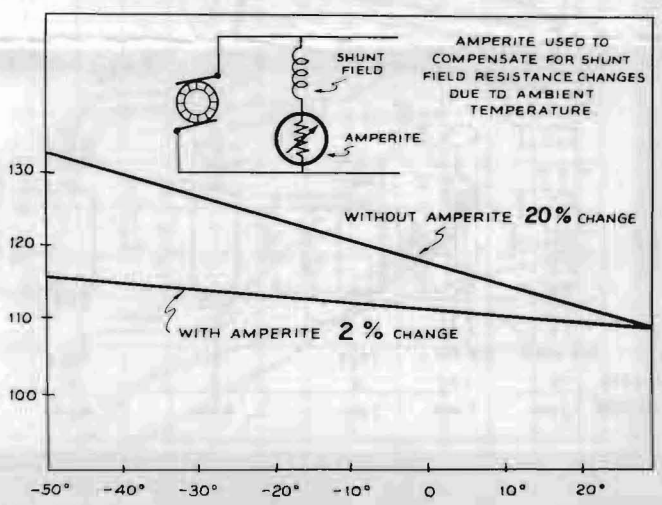


FIG. 8—Method of compensating for shunt field resistance changes due to ambient temperature changes.

AMPERITE BALLAST-REGULATING TUBE

TYPICAL REGULATING PROBLEMS — WITH SUGGESTED VOLTAGE LOADS

FOR VARIOUS POWER SUPPLIES

We strongly recommend, for any particular application, to fill in and return one of our special problem sheets — *ASP 343*, and permit us to recommend the most suitable *Amperite*.

POWER SUPPLY	*Dry Cells*	*6 Volts*	*12 Volts*	*26 Volts*	*115 Volts*
Supply variation	2.2-3.0V	5.5-7.5V	10.0-14.0V	22.0-30.0V	105-125V
*Desired on load	1.8-2.0V	3.9-4.1V	6.1- 6.4V	17.5-18.5V	90- 95V
Required on *Amperite*	0.4-1.0V	1.6-3.4V	3.9- 7.6V	4.5-11.5V	15- 30V
Current variation	.29- .32a	.29- .31a	.29- .31a	.29- .32a	.29- .32a

***The above chart shows the maximum load voltage** for the given supply to obtain ± 2% regulation on load. Better regulation is obtainable by increasing the voltage across the *Amperite*. In general, the higher the percent of the supply voltage taken by the *Amperite*, the better the regulation.

Current Tolerance in the above table is the manufacturing Tolerance which includes regulation and manufacturing variations. Any one tube, however, will change much less. For example, on the 12V supply the manufacturing tolerance is 0.29 to 0.31a.—(20 ma. variation). Any one tube, however, will not change more than 10 ma.

On 115V supplies—±1% regulation can be obtained by shunting the load or transformer primary with a G.E. 3W—NE-44 Neon Lamp (Fig. 4). 1 G.E. 3W—NE-44 Neon Lamp should be used for each 50 watts of load. This is the cheapest and most compact method of obtaining ±1% regulation. The *Amperite* is not affected by frequency changes.

AGEING: *Amperite Ballast Tubes* will change approximately up to 3% in current if aged for 4 to 8 hours, at maximum voltage. They will change very little thereafter.

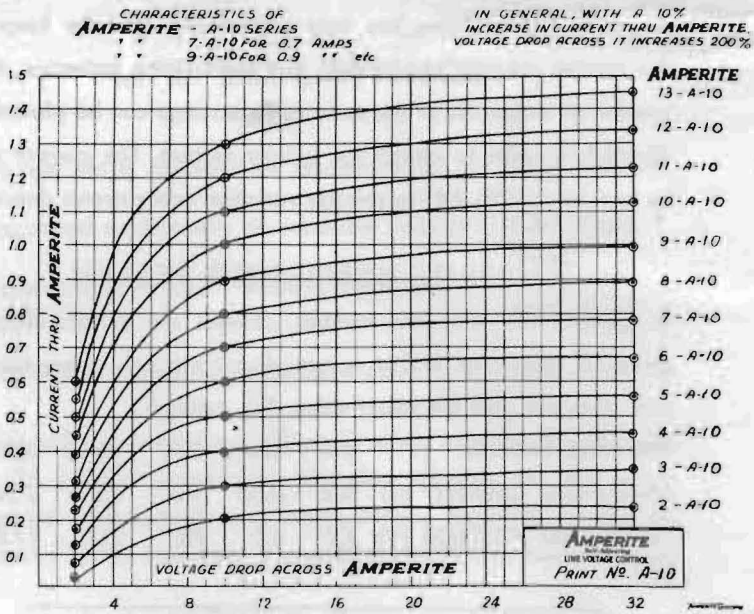
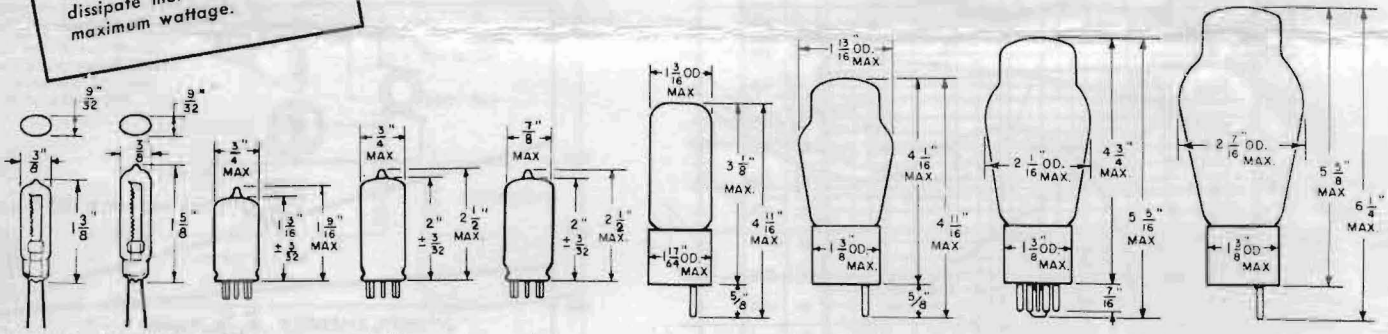


FIG. 9—A series of *Amperites* available in steps of 0.1 amps—voltage drop 12 to 30 volts.

STANDARD SIZES available for various wattage consumption . . . For good regulation, a bulb should not be required to dissipate more than 50% of maximum wattage.



SIZE	SUB. MIN. S	SUB. MIN. L	T5½S	T5½L	T6½L	T9	ST-14	ST-16	ST-19
MAX WATTS	1W	2W.	3	5	5	12	20	30	60
WT. PER TUBE	1¾ GMS.	2 GMS.	7 GMS.	8 GMS.	8 GMS.	1 oz.	2¼ oz.	2½ oz.	2¾ oz

Cable: Alkem, New York

AMPERITE Company Inc.

561 Broadway • New York 12, N. Y.

Telephone: CAnal 6-1446

In Canada: Atlas Radio Corp., Ltd., 560 King St., W., Toronto 2B

HJG/G/3-57-5M

Printed in U.S.A.

AMPERITE Company Inc.
561 BROADWAY NEW YORK 12, N. Y.

BULLETIN No. ASP 343
Amperite Regulator
Special Problem Sheet.

Amperite Ballast-Regulating Tubes offer the simplest, most compact, lightest, and least expensive method of voltage and current control. Can be used for keeping the voltage constant on bridge circuits, lamps, radio sets, transformers, etc.

In general, the Amperite will increase in voltage 200% with a 10% change in current through it.

CAUTION: It has been our experience that MORE SATISFACTORY REGULATION IS OBTAINED BY LETTING US CALCULATE AND DETERMINE THE PROPER AMPERITE. Merely fill out this sheet and let us do the rest.

The following information is required to determine the most suitable Amperite. Please fill out and return.

A. Variation of the supply voltage ..... TO V.

B. Maximum permissable voltage across apparatus ..... TO V.

C. Required voltage variation across Amperite – A minus B ..... TO V.

D. Current through apparatus with voltages of B applied ..... TO a.

E. Nature of supply voltage – AC, DC power line, dry cell .....

F. Nature of the load–resistor, lamp, motor, etc .....

H. If size is important, advise maximum space available .....

I. Approx. how many hours will apparatus be used per year .....

J. Approx. times will apparatus be turned on and off per day .....

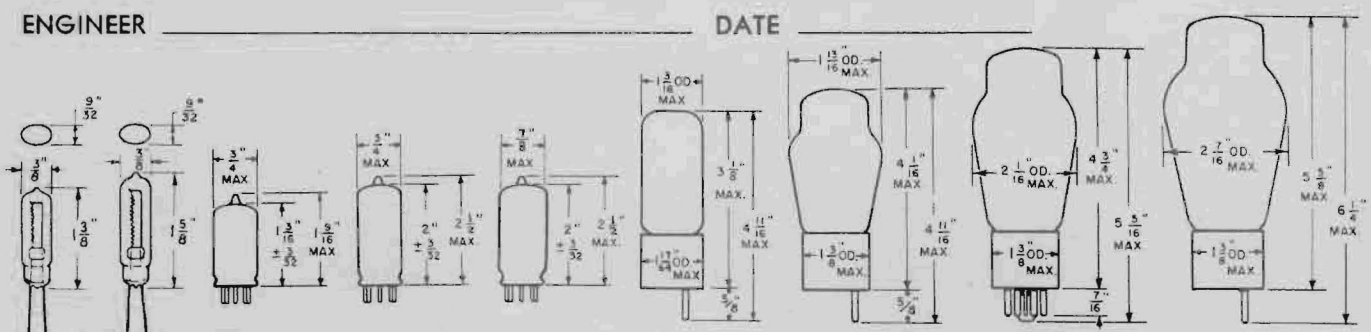
K. Approx. quantities required per year .....

L. Give sketch of circuit showing the voltage drop or resistance of the various component parts.

COMPANY _____

ADDRESS _____

ENGINEER _____ DATE _____



SIZE	SUB. MIN. S	SUB. MIN. L	T5½S	T5½L	T6½L.	T9	ST-14	ST-16	ST-19	SIZE
MAX. WATTS	1 W	2 W	3	5	5	12	20	30	60	MAX. WATTAGE
WT. PER TUBE	1¾ GMS.	2 GMS.	7 GMS.	8 GMS.	8 GMS.	1 oz.	2¼ oz.	2½ oz.	2¾ oz.	WT. PER. TUBE

HJG/U/ 6-56-10M

AMPERITE COMPANY, INC.

SALES OFFICES THROUGHOUT THE WORLD · CABLE: ALKEM - NEW YORK

561 BROADWAY, NEW YORK 12, N.Y.

Telephone: CAnal 6-1446

July 15th, 1955

Grote Reber
G.P.O.Hobart
Tasmania, Austrialia

RE: Amperite Ballast Tubes for 120 ma.

Dear Mr. Rber:

In answer to your recent letter - we are very sorry to advise that we do not have an Amperite in 120 ma. witha drop as low as 0.6 volts. We also do not have at this time - anything less than a T5 1/2 bulb.

If you can use an Amperite with a drop of approximately 2 to 4 volts - we will be glad to supply same.

Very truly yours,

AMPERITE CO.INC.

S. Ruttenberg

S.RUTTENBERG:TW

3rd July 1955
G.P.O., Hobart
Tasmania, Australia

Amperite Company, Inc
561 Broadway, New York 12
New York, U.S.A.

Att: Mr. T. Whalen

Gentlemen:

I wish to purchase eight small ballast tubes as follows.

Average current thru ballast	0.12ampere
Minimum drop across ballast	0.6 volt
Maximum drop across ballast	1.0 volt
Bulb type	T-3
Supply	Dry cell
Load	Lamp
Turned on and off once a day	

They will be paid for in American funds and shipped to my Wheaton, Illinois address. Please advise whether or not you can make these, their cost plus postage and the earliest possible shipping date.

Very truly yours,

Grote Reber

MARCONI INSTRUMENTS

PORTABLE RECEIVER TESTER

Type TF 888/3

THE INSTRUMENT combines a wide-range signal generator with internal and external amplitude modulation, a tone source of variable level and an audio frequency power meter, in one very compact assembly which can be fitted either with a power pack for a.c. supply mains or with a dry battery unit. Provision is made for crystal standardization for use when frequency accuracy is essential.

The r.f. range is from 70 kc/s to 70 Mc/s and an attenuator provides calibrated outputs between 1 μV and 10 mV at source impedances of 52 and 80 ohms; higher, uncalibrated, outputs up to 500 mV are available for general testing.

The 1,000-c/s tone source may be used either to apply 30% amplitude modulation to the r.f. oscillator or may be used for external testing. The power meter, which is primarily for use at 1,000 c/s, has three measurement ranges extending up to 1 watt and four input impedance settings ranging between 3 and 600 ohms.

DESIGN DETAILS

The frequency range is continuous and is covered in eight bands, a rotating coil turret being employed. The r.f. level is set by a potentiometer controlling the screen voltage of the oscillator valve, the output from the a.f. oscillator—or from an external source—being superimposed on this voltage when modulation is required.

The r.f. level is monitored by a calibrated meter and crystal rectifier which is standardized by a balance method at 1,000 c/s, the a.f. oscillator being used as the source. The signal is then applied to an 80-db step attenuator, which is a resistive ladder network permanently connected by concentric cable to a terminating unit with three outlets—the normal calibrated outlets at 52 and 80 ohms and a high level outlet at 40 ohms. The output from the latter is normally of the order of 70 mV maximum but may be increased to approximately 500 mV by switching the attenuator to an uncalibrated setting designated MAX O/P.

The auxiliary crystal-controlled oscillator can be switched to give an output, at either 500 kc/s or 5 Mc/s, which can be mixed with the main r.f. output to produce reference points of accurately known frequency; provision is made for the connection of headphones into the crystal check circuit to give indication of zero beat.

Except that it makes use of the same panel instrument, the a.f. power meter is essentially a separate circuit. The main selector switch is so arranged that the signal generator may be either modulated or unmodulated when the power meter is in use, thus enabling overall tests to be applied to the receiver under investigation. Similarly an a.f. output is available for the testing of amplifiers.

As the instrument is designed for use with either a battery unit or an a.c. power pack, directly heated valves are used, the h.t. and l.t., in the case of a.c. operation, being supplied by two separate full-wave metal rectifier systems. Provision is made for switching the panel meter to check the h.t. and l.t. voltages on load.

cost £166/5/0 + tax in Australia from AWA

SPECIFICATION

Type TF 888/3

Frequency

RANGE: 70 kc/s to 70 Mc/s in eight bands:—

70 to 200 kc/s	4·5 to 10 Mc/s
200 to 600 kc/s	10 to 20 Mc/s
0·6 to 1·5 Mc/s	20 to 40 Mc/s
1·5 to 4·5 Mc/s	40 to 70 Mc/s

CALIBRATION ACCURACY: ± 2%.

CRYSTAL CHECK: 500-kc/s and 5-Mc/s crystals, with an accuracy of 3 parts in 10^4, are incorporated for spot checking at fundamental and harmonic frequencies.

Output

VOLTAGE: A nine-step attenuator is calibrated in 8 steps of 10 db over the range 1 μV to 10 mV, the auxiliary maximum output step giving approximately 500 mV. The meter is calibrated from ×1 to ×0·4.

ACCURACY: The accuracy on c.w. over the calibrated range is:—

10% ± 1 μV up to 15 Mc/s.
15% ± 1 μV up to 30 Mc/s.
20% ± 1·5 μV up to 70 Mc/s.

IMPEDANCE: 52 and 80 ohms over calibrated range. 40 ohms approx. at high level outlet.

1,000-c/s A.F. Oscillator

AS TONE SOURCE: Up to 12 volts output at high impedance.

AS R.F. MODULATOR: Nominal depth of 30%. (A.M. can also be applied externally)

A.F. Power Meter

RANGES: 10 mW, 100 mW and 1 watt full scale.

ACCURACY: ± 10% at 1 kc/s.

INPUT IMPEDANCE: 3, 33, 150 and 600 ohms.

Power Supply

100 to 125 volts (40 to 100 c/s), or 200 to 250 volts (40 to 100 c/s), or 90-volt h.t. and 3-volt l.t. batteries, as specified when ordering.

Dimensions (over projections)

Height	*Width*	*Depth*
11½ in (30 cm)	15½ in (40 cm)	7½ in (20 cm)

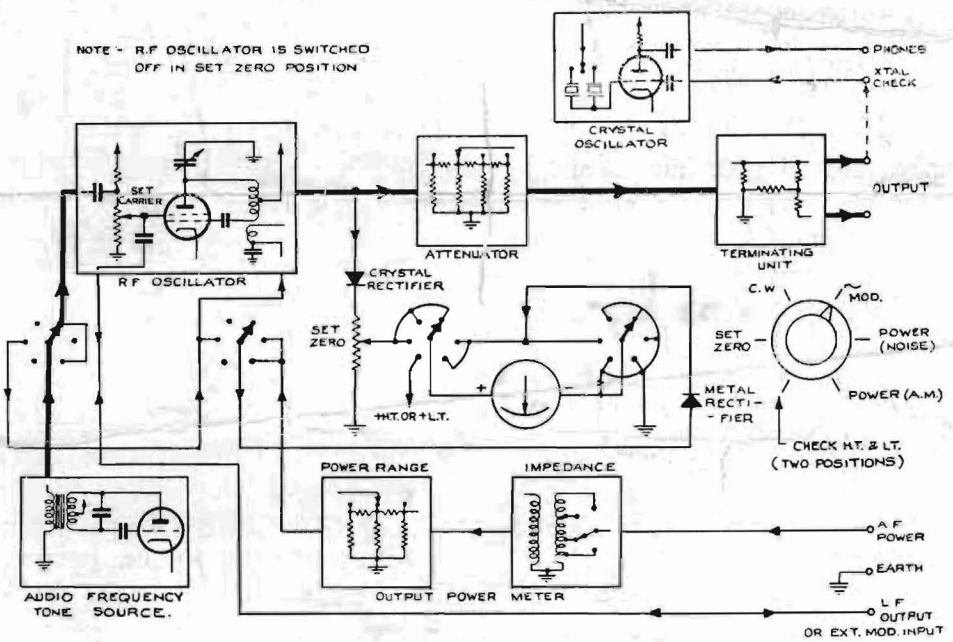
Weight

17½ lb (8 kg).

Finish

Panel: Polished grey enamel.

Case: Rivelled grey enamel.



Functional Diagram of TF 888/3

MARCONI INSTRUMENTS LIMITED · ST. ALBANS · HERTFORDSHIRE · ENGLAND

Printed in England. 1/55.

Portable Receiver Tester

Type TF 888/3

Frequency range : 70 kc/s to 70 Mc/s

Built-in crystal calibrator

Sinewave a.m.

1,000-c/s source and power meter for a.f. testing

Alternative mains/battery operation

A CRYSTAL STANDARDIZED signal generator covering from 70 kc/s to 70 Mc/s is combined with a tone source and audio power meter in this compact and portable instrument. R.F. outputs from 1 μV to 10 mV are available at either 52 or 80 ohms and higher uncalibrated outputs up to 500 mV can also be obtained.

The 1,000-c/s tone source may be used either to apply 30% amplitude modulation to the r.f. oscillator or may be used for external testing. The power meter, which is primarily for use at 1,000 c/s, has three measurement ranges extending up to 1 watt and four input impedance settings ranging between 3 and 600 ohms.

DESIGN DETAILS

The frequency range is continuous and is covered in eight bands, a rotating coil turret being employed. The r.f. level is set by a potentiometer controlling the screen voltage of the oscillator valve, the output from the a.f. oscillator—or from an external source—being superimposed on this voltage when modulation is required.

The r.f. level is monitored by a calibrated meter and crystal rectifier which is standardized by a balance method at 1,000 c/s, the a.f. oscillator being used as the source. The signal is then applied to an 80-dB step attenuator, which is a resistive ladder network permanently connected by concentric cable to a terminating unit with three outlets—the normal calibrated outlets at 52 and 80 ohms and a high level outlet at 40 ohms.

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Except that it makes use of the same panel instrument, the a.f. power meter is essentially a separate circuit. The main selector switch is so arranged that the signal generator may be either modulated or unmodulated when the power meter is in use, thus enabling overall tests to be applied to the receiver under investigation.

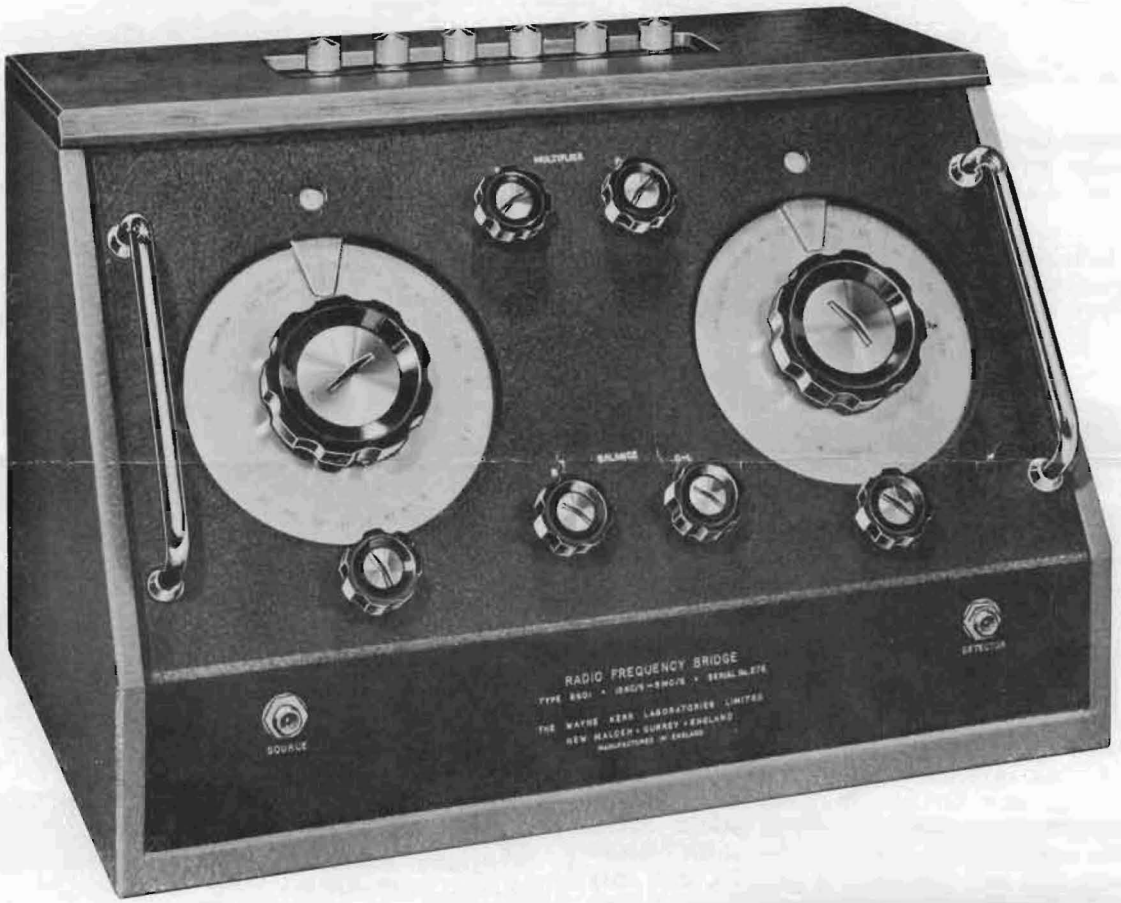
As the instrument is designed for use with either a battery unit or an a.c. power pack, directly heated valves are used, the h.t. and l.t., in the case of a.c. operation, being supplied by two separate full-wave metal rectifier systems. Provision is made for switching the panel meter to check the h.t. and l.t. voltages on load.

MARCONI INSTRUMENTS

cost $495 in America from Marconi Instruments 111 Cedar Lane, Englewood, N.J.

Radio Frequency Bridge

TYPE **B.601**



A multi-ratio bridge for the measurement of resistance inductance and capacitance over a wide range at frequencies between 15 kc/s, and 5 Mc/s.

Wayne Kerr

WAYNE KERR LABORATORIES LIMITED, NEW MALDEN, SURREY, ENGLAND

1956 { Price £125/-/- F.O.B England
" A$205/-/- " Melbourne (Geo. Sample & Co)

Radio Frequency Bridge *TYPE* **B.601**

A MULTI-RATIO BRIDGE for the measurement of resistance, inductance, and capacitance over a wide range, at frequencies between 15 kc/s and 5 Mc/s. It employs the tapped transformer principle, described in a separate leaflet. Co-axial leads are provided for connection to separate source and detector.

The B.601 bridge will also measure complex impedances, balanced, unbalanced, or balanced with the centre-point earthed, and any pair of terminals in a three-terminal network.

It has the advantage of extreme stability, due to the fact that the impedance looking back into the terminals and the impedance to ground at balance are both extremely low.

principle of operation

The B.601 Bridge utilises the tapped transformer principle in which the ratios are obtained by tappings on two accurately-wound wide band transformers instead of by the conventional ratio arms.

The turns ratio of the transformers is calculated to give convenient multiples and sub-multiples of a known standard, which can be of small physical size.

In the simplest application of the principle, equal voltages are applied to the known and unknown impedances from the input transformer connected to the source. When the bridge is balanced, equal and opposite currents flow through the output transformer primary winding, producing zero flux linkage with the secondary. The detector connected to the secondary winding will therefore indicate balance.

In the case of unequal ratios in the output transformer a relatively large current through the low impedance arm can be balanced by a smaller current through the higher impedance arm.

In the B.601 bridge the primary winding of the output transformer is tapped to give ratios of 1:1 and 10:1, and an auto-transformer connected across part of the winding provides a ratio of 100:1. In the measurement of impedance, which consists of resistance and reactance in parallel, it is only possible to neutralise the flux in the transformer winding if both the reactive and resistive components of the currents through the arms are equal and opposite.

The resistive component is balanced in the bridge circuit by using a voltage divider across part of the source transformer and applying a varying voltage to the output transformer through a known resistance.

performance

The bridge measures R and L as a parallel combination, the inductive component being measured as a negative capacitance. The bridge indicates the value of capacitance having the same reactance as the unknown impedance, and therefore to arrive at the value of inductance, the frequency must be known.

The resistance scale is direct-reading, independently of frequency, and only requires to be multiplied by the scale and terminal factors marked on the instrument.

The bridge is not suited for the direct measurement of dielectric loss in high-grade insulating material, but this can be measured by a substitution method with an external three terminal air dielectric capacitor. Using the "Neutral" terminal of the bridge this capacitor can be made virtually lossless.

The bridge will measure accurately all aerial and transmission line impedances whether balanced or unbalanced. It is important, however, to ensure that the detector is adequately screened from direct radiation from the cable or aerial under test.

specification

FREQUENCY RANGE: 15 *kc/s to* 5 *Mc/s.*

CAPACITANCE RANGE: 0.01 *pF to* 20,000 *pF in* 5 *ranges on the dial.*

RESISTANCE RANGE: 10 *ohms to* 10 *megohms in* 6 *ranges on the dial.*

INDUCTANCE RANGE: 0.5 *μH to* 50 *mH.*
The accuracy of measurement is dependent on the accuracy of source, since the reactance is balanced by a reactance of opposite sign.

ACCURACY: *With the reservation already stated, the general direct-reading accuracy is* 1% *over the major part of the range.*

DIMENSIONS: 15" *by* 11" *by* 9½" *deep.*

WEIGHT: 25 *lb. approx.*

PRINTED IN ENGLAND BY KRISSON PRINTING LTD