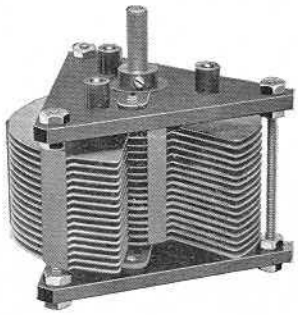
GENERAL RADIO COMPANY

MANUFACTURERS OF

ELECTRICAL AND RADIO LABORATORY APPARATUS

CAMBRIDGE, MASSACHUSETTS

BULLETIN 103 **JANUARY 1922**



Type 247
VARIABLE AIR CONDENSER

Experimental radio receiving sets require condensers whose quality is high and whose price is reasonable. It is easy to manufacture low-priced condensers as is evidenced by the large number now available. It is more difficult, however, to construct a condenser which is electrically and mechanically good, and yet at the same time to keep the cost of construction low.

For many years the subject of dielectric losses and condenser design has been studied in the Research Laboratory of the General Radio Company. This study has been carried on primarily in order to obtain data for the design of special condensers built to the exacting standards of scientific research work. With this information available, and with our experience in the design of laboratory instruments, we have been able to design a condenser of unusual merit for radio work and, at the same time, to keep its cost of construction remarkably low.

The value of a good condenser in a receiving set is not always fully appreciated. The dielectric losses of the condenser are equivalent to adding a series resistance in the oscillating circuit. To add a series resistance in the oscillating circuit means loss of energy which, in turn, means broad tuning and diminished signal strength. It is thus important that the dielectric losses in condensers be kept low. In this condenser these losses are kept low by using only a high-grade hard rubber for the solid dielectric. They are further kept low by using only a small quantity of this dielectric and so placing it with respect to the electrostatic field that the dielectric hysteresis losses are kept a minimum.

This is just one of the points which have received careful attention in the design of this condenser. Other important features include the following:

CAPACITY SCALE: In addition to the regular degree graduations of the etched metal dial, this dial has marked on it a scale showing capacities in micromicrofarads. This is a unique and valuable feature for radio receiving condensers, and it enables the operator to know at all times just what capacity he is using.

PLATES SOLDERED TOGETHER: In order that the plate resistance may be kept constant, and that the capacity always will remain the same, the plates of the rotary unit and the plates of the stator unit are all soldered together.

HEAVY ZINC PLATES: The plates are of heavy sheet zinc adequately spaced to prevent short-circuiting. Rugged plates of good conductivity are very desirable features in condenser construction.

BEARINGS: A special type spring bearing is used to insure good contact being made with the rotary plates. With this special type of bearing the tension always remains the same, and there is no chance for the rotary plate unit to loosen as the bearing wears. These bearings are so arranged that all the thrust is on one bearing, so that there is no danger of the condenser short-circuiting or changing its capacity if the distance between the bearings becomes changed.

LOW ZERO CAPACITY: The zero capacity of this condenser is approximately 20 micromicrofarads. This low value makes a wide range of wavelengths possible. The maximum capacity is 1000 micromicrofarads.

METAL CASE GROUNDED TO ROTARY PLATES: The condenser is mounted in a metal case finished with our black crystalline finish, the same as is used on our most expensive laboratory instruments. This case is grounded to the rotary plates, thus shielding the condenser and eliminating many of the disturbing effects due to bringing the hand near the condenser.

Do not deny your receiving set the advantages of a scientifically designed condenser.

Type 247A Condenser, completely mounted.....$5.50
Dimensions 4½"D x 3½". Weight 1¾ lb.
Code Word "CRONY."

This condenser may also be supplied without case, panel, knob, dial or binding posts, suitable for back of panel mounting.

Type 247B Condenser, unmounted $3.25
Dimensions 3¾" x 3¾" x 3½". Weight 1 lb.
Code Word "CRUEL."

Knob and dial, without capacity graduations, for use with Type 247B Condenser .....$ .50

All prices in this bulletin are strictly net, subject to change without notice, F. O. B. Cambridge, Mass. Cash should accompany orders from persons or firms with whom we have not already opened accounts. Unless otherwise instructed we shall use our own judgment regarding method of shipment.

GENERAL RADIO COMPANY

MANUFACTURERS OF

ELECTRICAL AND RADIO LABORATORY APPARATUS

CAMBRIDGE, MASSACHUSETTS

BULLETIN 105 **AUGUST 1922**

Type 219F
DECADE CONDENSER

It is often as necessary to have an adjustable decade condenser for laboratory work as it is to have a decade resistance box. The utility of such a condenser is greatly reduced if it is necessary to open and close switches or to remove plugs to vary its capacitance. The condenser should have the same flexibility as a decade resistance box.

This feature of flexibility has been accomplished by the use of a sector switch, thus enabling the capacitance to be varied in the same easy manner as is done in our decade resistance units. The setting of the switch is definite, being determined by a ball and

socket locking combination. The capacitance in microfarads is read directly opposite the end of the switch pointer.

In the 219F unit we have a two-dial combination giving a total capacitance of 1.1 microfarads. Each dial has ten steps, the lower dial of .01 microfarad each and the upper dial 0.1 microfarad each. This makes the range of the condenser from .01 microfarad to 1.1 microfarad adjustable in steps of .01 microfarad.

The condenser units are our specially wound, low-loss paper condensers adjusted with an accuracy of 2 per cent. Each condenser is separately mounted and is independent of the others of the unit. As these condensers are sealed in a hard-wood block, they cannot become loose or damaged. They will stand potentials of 300 volts. The complete unit is mounted in an attractive oak case with bakelite panel.

This condenser is particularly useful in filter or oscillating circuits. It is, in fact, an excellent all-around laboratory instrument.

Type 219F Decade Condenser $50.00

Dimensions 10″ x 5″ x 5¾″. Weight 6½ lbs.

Code Word "COVER"

Type 239
VARIABLE AIR CONDENSER

The recent studies of dielectric losses have brought out forcibly the necessity for giving much attention to these losses in condenser design. Their importance has been further emphasized by the requirements of vacuum tube oscillating circuits. Such circuits demand for sharp resonance that these losses be kept a minimum. Condensers which might be adequate for crystal receiver circuits would be quite unsatisfactory for use in vacuum tube oscillating circuits.

Where great precision is required, there is available our Type 222 precision condenser. Because of its necessarily elaborate design, however, it is not suitable for installation in radio sets or for general laboratory use. It is a precision standard. In order to have available a condenser which would meet the general laboratory requirements and the rigid requirements of carefully designed radio sets, we have developed the rugged, low-loss condenser shown in the cut. This condenser is similar in general design to our precision condenser. It has metal end plates, locked cone bearings and is rigidly supported. The only solid dielectric material used is in the form of supporting strips for the fixed plates. These strips are of carefully selected hard rubber, and are placed in a weak and

uniform electrostatic field. This enables us to keep the losses at a minimum. The equivalent series resistance is but 12 ohms at a frequency of 1000 cycles and a capacitance of 1000 micromicrofarads. This is of the order of about a tenth of what is usually obtained in good variable air condensers. This very low loss enables oscillating circuits to be turned very sharply. This condenser will stand potentials up to 500 volts.

The rotary plates are grounded in order that capacity effects of the hand when adjusting the condenser may be reduced to a minimum. The plates are of heavy aluminum and are so shaped as to give a nearly uniform wavelength variation. This is particularly important when the condensers are to be used in wavemeters or radio receiving sets.

Type 239
VARIABLE AIR CONDENSER

All types of this condenser are provided with a counterweight and when so desired, may be equipped with a slow-motion gear so that settings to a fraction of a division on the scale may be obtained with ease. This is a distinct advantage when tuning to continuous wave stations.

When mounted, the condenser is provided with oak case and engraved bakelite panel. All condensers, whether mounted or unmounted, are equipped with a three inch silvered dial divided into one hundred divisions.

Type 239E 1000MMF. Mounted. Without gear.....$15.50
Dimensions 6" x 6" x 7". Weight 4½ lbs.
Code Word "BABEL."
Type 239E 1000MMF. Mounted. With gear.....$19.00
Dimensions 6" x 6" x 7". Weight 4½ lbs.
Code Word "BANDY."
Type 239E 1000MMF. Mounted. With gear. Calibrated..$20.50
Dimensions 6" x 6" x 7". Weight 4½ lbs.
Code Word "BANJO."
Type 239G 1000MMF. Unmounted. Without gear.....$10.00
Dimensions 4½" x 4¾" x 6". Weight 2 lbs.
Code Word "BARON."
Type 239G 1000MMF. Unmounted. With gear.....$13.50
Dimensions 9½" x 4¾" x 6". Weight 2 lbs.
Code Word "BASAL."
Type 239J 2000MMF. Mounted. Without gear.....$18.50
Dimensions 6" x 6" x 9". Weight 6 lbs.
Code Word "BASIN."
Type 239J 2000MMF. Mounted. With gear.....$22.00
Dimensions 6" x 6" x 9". Weight 6 lbs.
Code Word "BATTY."
Type 239J 2000MMF. Mounted. With gear. Calibrated..$23.50
Dimensions 6" x 6" x 9". Weight 6 lbs.
Code Word "BATON."
Type 239L 2000MMF. Unmounted. Without gear.....$13.00
Dimensions 4½" x 4¾" x 6". Weight 3 lbs.
Code Word "BAYAN."
Type 239L 2000MMF. Unmounted. With gear.....$16.50
Dimensions 4½" x 4¾" x 6". Weight 3 lbs.
Code Word "BEFIT."

The products of the General Radio Company cover a complete line of radio and electrical laboratory apparatus. Information and bulletins of special apparatus will be sent on request. Our line includes the following: Variable Air Condensers, Vernier Condenser, Standard Condensers, Decade Condensers, Variometers, Standards of Inductance, Standards of Resistance, Decade Resistance Boxes, Wavemeters, Decade Bridge, Capacity Bridge, Slide Wire Bridge, Audibility Meter, Hot Wire Meters, Galvanometers, Thermo-Couple, Telephone Transformer, Miscellaneous Apparatus.

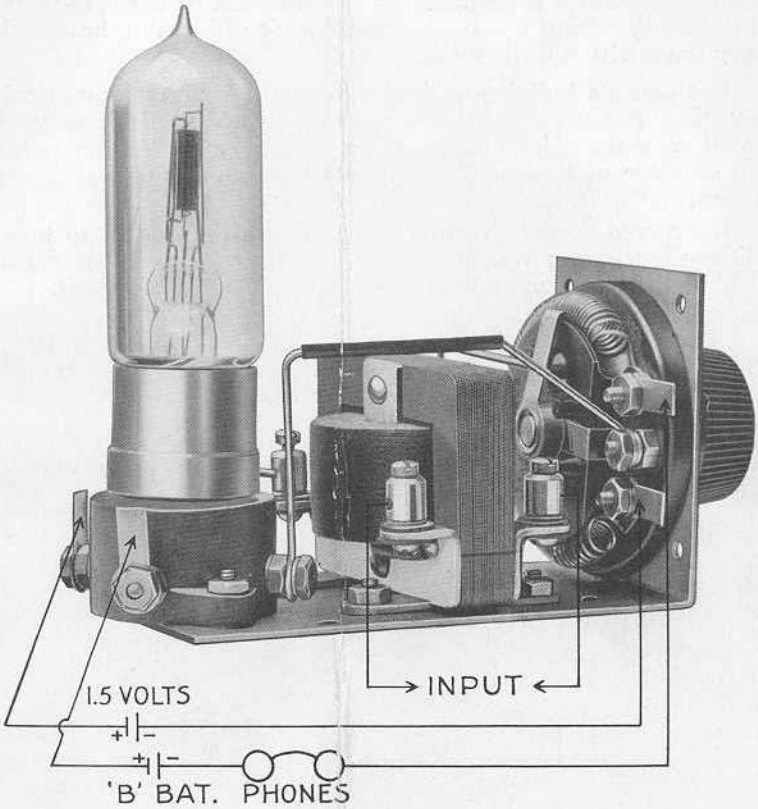
All prices in this bulletin are strictly net, subject to change without notice, F. O. B. Cambridge, Mass. Cash should accompany orders from persons or firms with whom we have not already opened accounts. Unless otherwise instructed we shall use our own judgment regarding method of shipment.

[This Bulletin replaces Bulletin 104]

Standardize on General Radio Apparatus Throughout.

SHIP OWNERS RADIO SERVICE INC.
DISTRIBUTORS FOR
GENERAL RADIO COMPANY
MANUFACTURERS OF
ELECTRICAL AND RADIO LABORATORY APPARATUS
CAMBRIDGE, MASSACHUSETTS

BULLETIN 913 DECEMBER 1922



Type 300-A
AMPLIFIER UNIT

The recent tendency in radio has been towards the simplifying of instruments, yet retaining the same distance range. The WD-11 tube is a striking example of this.

Continuing this idea of simplicity we have developed a handy amplifier unit. This unit, as will be noted from the diagram, is self-contained except for power sources and receivers. It is already for connection to your detector set, be it a tube or a crystal unit. No storage

battery is required. A single dry cell serves for the filament battery, and a single unit such as the Eveready Type 763 for the plate battery.

This unit is so mounted that it may be used on a table or mounted behind a panel. When mounted behind a panel only the rheostat knob is visible in the front of the panel. The unit has mounting holes provided for either panel or table installation.

The parts of this unit amplifier are our new Type 282 Socket built for the WD-11 tubes, Type 255 Rheostat, and Type 231-A Amplifying Transformer, which is particularly well adapted to the WD-11 tubes. All necessary wiring has been provided. The mounting bracket is of heavy brass with a white nickel finish.

For persons building their own sets these units are particularly convenient because of the panel mounting feature. It is only necessary to screw the unit to the panel—no auxiliary brackets are required. Two or more of these units may be used to obtain multi-stage amplification.

If required these units may be supplied with a socket to take the ordinary four-prong vacuum tubes. The price of these special units would be fifty cents more than the standard WD-11 tube unit.

When you amplify—simplify.

Type 300–A Amplifier Unit.....$7.50

Dimensions 6″ x 2½″ x 2¾″. Weight 1½ lbs.

Code Word "AMAZE"

Tube or batteries are not included in the above price.

Type WD-11 Vacuum Tubes.....$6.50
Type 763 Eveready 22-volt Plate Battery..... 1.75

Type 282
WD–11 VACUUM TUBE SOCKET

The new, low, filament voltage Type WD-11 Vacuum Tubes will not fit the former standard American socket. The use of an adapter is inconvenient and expensive. Our new Type 282 Socket is designed expressly for the WD-11 tube.

This new socket is of moulded bakelite and is equipped with positive contact phosphor bronze springs. When the tube is inserted in the

socket the springs make contact against the sides of the prongs and do not depend upon the downward pressure of the tube. The four connection terminals are plainly marked. This socket is a characteristic General Radio quality product.

Type 282 Socket.....$0.80

Dimensions 2½" x 1¾" x 1". Weight 2 oz.

Code Word "SOLID"

Type 255
FILAMENT RHEOSTAT

For those who desire a rugged, smooth operating, yet inexpensive filament rheostat we have developed a new model to supplement our standard Type 214 Rheostat. Low price has been secured by simplicity in design rather than in the use of substitute materials.

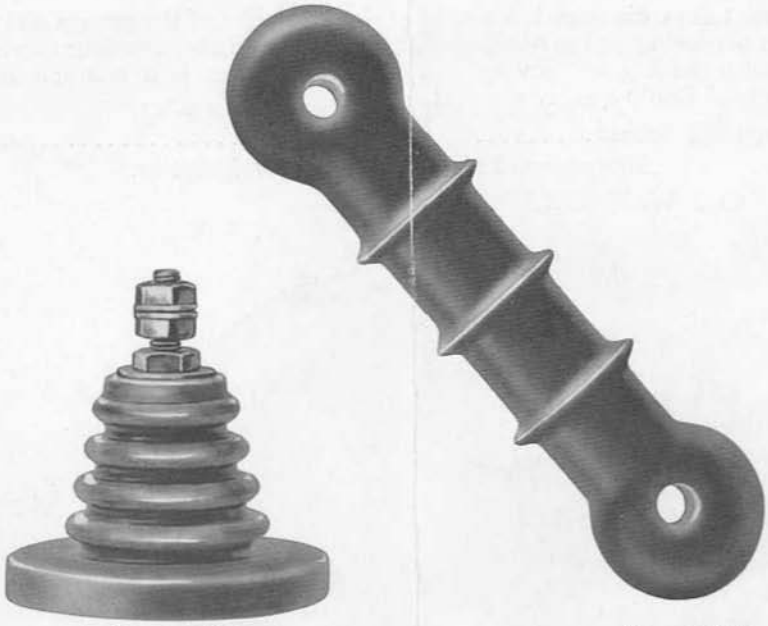
Like the larger rheostat the base is of moulded bakelite, not one of the inferior compositions so often substituted. The wire is wound in helical form and fits tightly in a groove in the base. The rheostat may be mounted either on the front or back of a panel. Terminals have been placed at each end of the resistance element so that the direction of rotation will be correct for either mounting. An off position is also provided.

The resistance is 6 ohms and the current carrying capacity 1.25 amperes. This combination is suitable for the UV-200, UV-201 and WD-11 tubes.

Type 255 Rheostat.....$1.00

Dimensions 2½" x 2½" x 1⅞". Weight 4 oz.

Code Word "RALLY"



Type 260 **Type 280**

Porcelain, which has losses but one-tenth that of the usual moulded materials, is rapidly becoming the standard material for insulators.

For antenna insulation, correctly designed porcelain strain insulators are to be preferred to other commercial types. The Type 280 Strain Insulator illustrated above will be found particularly satisfactory. It is made of carefully glazed brown porcelain and will withstand severe weather conditions.

Type 280 Strain Insulator.....$0.25

Dimensions 4½" x 1⅛" x 1". Weight 4 oz.

Code Word "CRULLER"

Another convenient insulator is the Type 260 illustrated above. It may be used inside to support wiring or instruments, or may be used outside for supporting lead-in or ground wires. Two of these insulators with a threaded rod connecting them make an excellent lead in combination. As they are also constructed of glazed brown porcelain they may be used either indoors or out. Each insulator is equipped with nuts and washers assembled as shown in the cut. Three polished nickel mounting screws are also provided.

Type 260 Insulator.....$0.35

Dimensions 2⅛" x 2⅛" x 2". Weight 4 oz.

Code Word "CONIC"