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*Patent applied for.

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Rider's Manual V

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JUST AN IDEA

of how extensively Volume V covers the field. This is a partial list of the manufacturers in Volume V.

<table>
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<th>Name of Manufacturer</th>
<th>Models</th>
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</table>

946 Models

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**NEVER before in the history of Radio has such a stupendous compilation of technical servicing material been collected between two covers. Expense was not spared to make Rider's Volume V all-embracing in its scope. Sets are explained even more lucidly than those of yesteryear, for complications galore are incorporated in 1935 receivers. Seeing is believing—prove to yourself that Rider's Volume V is without doubt the servicing sensation of the year—better than any other manual—the absolute peer!**

Rider's Volume V all-embracing in its scope. Expense was not spared to make Rider's Volume V.

Due to the collapse, in part at least, of honest price structures during the past few years of industrial depression, an evil practice has sprung up amongst unscrupulous jobbing houses and dealers. The reliable manufacturers who have spent millions of dollars and years of research and energy in establishing a trade name which stands for honest values, conscientious service and fair dealing have found themselves facing unfair competition in the shape of fly-by-night concerns who manufacture items supposedly of similar value to those of the old-line companies but which are offered to the trade at ridiculously low prices.

Eastern mail-order houses have flooded the country with catalogues containing many “bargains” consisting of the most part of salvaged, discontinued, factory second and orphan items. Manufacturing concerns have come into existence over-night to manufacture inferior products under misleading names in an effort to secure by fair means or foul some of the dollars spent by service technicians and dealers for replacement parts. These jobbers and manufacturers of distress merchandise make and sell condensers whose voltage and capacity ratings are exaggerated—resistors whose power ratings and values are misrepresented—power transformers whose characteristics and load capacities are overstated. Radio tubes which in truth are factory seconds or worse have been offered at ridiculously low prices. This list of misrepresented items could be extended to fill many pages but the alert service technician and dealer need only reflect upon his past experiences to realize the extent of this practice.

It must be realized that it never has been, is not and never will be possible to get something for nothing. Beware of off-brand items or supposedly fresh stock items of well-known brands at prices which obviously are lower than reason dictates! This distress merchandise is not always poorly manufactured and incorrectly rated but often consists of the products of worthy manufacturers which by devious means have come into the hands of these shady merchandisers. These products may actually be factory rejects or they may be warehouse stocks which have been damaged due to age, climatic conditions, fire or rough handling. These items, then, which their own manufacturers would not represent as worthy of bearing their first-class labels, are offered to the trade as the original high-grade merchandise which the name thereof would have the purchaser believe.

The only method of protection which the purchasing trade may use and which will be to the mutual benefit of all honest members of the trade is to deal only with reliable firms and then only purchase reliable products. Of course, the production of reliable, quality and first-grade products is not limited necessarily to the old companies. Many new companies have been formed, due to industrial readjustment and the need for improved manufacturing processes to meet the advance of the radio art. It is not difficult for the most part, however, to differentiate between reliable concerns.

(Continued from page 19)
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Part editorial reserved from the June issue of The "Technician:"

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**RESISTOR STUDIES AND DEVELOPMENTS**

By ENGINEERING STAFF, Henry L. Crowley & Company

High-Gain amplification as well as the handling of substantial wattages in present broadcast receivers invites microscopic examination and ultra-critical analysis of resistors used. It is not so much an optical matter, though a true microscopic study of resistor structure does reveal the "inside story." Rather it is a matter of practical results, since the microscopic structure of any resistor soon tells its own story through radio and electrical tests and usages.

A study of standard radio resistors reveals three broad classes in general use: (1) Wire-Wound; (2) Carbon-coated or film; and (3) Carbon composition, or molded type.

From the cost standpoint, the first, or wire-wound category can be disregarded so far as more general applications are concerned.

The second division or so-called carbon coated type, for a thin film of carbon deposited on a glass or porcelain rod or tube. In some instances this coating is spirally wound but the spiral form is relatively rare today. The coating or film is exceedingly thin and therefore quite fragile. Adhesion of film to supporting resistance values under difficult to control; contact is extremely delicate; transfer of heat energy depends on mechanical limitations of the whole assembly. The current-carrying capacity must necessarily be a function of the area or cross-section, so that when the resistance is increased solely by cutting down the thickness of the film, already very thin, it follows that the current-carrying capacity is impaired and the current density tremendously increased. This gives rise to overheating and localized stresses, and leads to ultimate failure and bad characteristics.

The third class is the so-called carbon stick or composition type, comprising a mixture of a very small percentage of conducting material, carbon, and an insulating material, molded under relatively low pressures. In actuality such a structure consists of a number of semi-round pebbles touching each other with point contacts. Therefore the path and the areas through which current may travel are greatly reduced by the large bulk of insulating particles and still further reduced by the point-contact conditions.

Just so long as resistors were employed in circuits of modest gain and low wattage values, the microscopic structure of their conducting mass was of no partic-ular concern to radio men. High-gain circuits and the handling of considerable power, however, have focused attention on the point of resistance materials, which is but another way of referring to the microscopic structure of such components.

The tremendous enlarged photographs of resistor structures reveal many voids, irregularities in the mass, uncertain contact between particles, and a general lack of homogeneity. The mass is frequently revealed as being porous rather than solid. Contact between particles is point-contact only. Consequently the current-carrying cross-section is truly microscopic in its proportions, and the current density of necessity is very high in such areas and through such point-contacts.

The foregoing assumption has been proven by studying, under the high power microscope, the action of units under both normal and excessive loads. Glowing points of light have been observed, demonstrating conclusively the intense microscopic current density. Naturally such points tend to alter characteristics both physically and electrically. A few of these resistors will handle mechanical loads and the changes noted under such loads have been in accordance with the above facts.

With such considerations in mind, we have sought to develop a resistor which, technically and practically, would overcome the objections already cited. First, instead of a background material of very high insulating value, we have substituted a background or bulk material which in itself is a resistance material. To vary this mass and thereby secure the desired resistance values, another resistance material of lower value is introduced. The entire mass, after it has been reduced to absolute uniformity, is subjected to tremendous pressure and extruded through dies into continuous rods. The mechanical and electrical tests are in line with many years of experience in this particular method of fabrication which we have followed in the production of ceramic insulators and parts.

The end result is a solid, uniform, compact current-carrying mass. The entire cross-section area is the same. There are no voids, no point-contacts, no variations in composition. Photomicrographs disclose an absolutely solid structure quite unlike the craters and pitted surfaces of (Continued from page IR)
LITTLE KNOWN FACTS ABOUT PATENTS

By BENJAMIN CHROMY, Attorney-at-Law

PART TWO

Now turning back to the examiner in the Patent Office, after he has studied the invention and claims and before he has made the search for prior patents, he must analyze all of the claims and determine just what each covers or defines. This is necessary because one claim may define an invention that is slightly different from that which is defined by the next claim. Let us assume for the present that in considering the foregoing claims to the audion, the examiner found a prior patent (or publication) showing a cathode, a grid and an anode structure all mounted in an envelope of glass. He could reject the first of the foregoing claims as being anticipated by this prior patent. But he could not properly reject the second claim on this prior patent unless the grid electrode shown in the prior patent was a control electrode. Thus one prior patent may be used to reject some of the claims of the application and yet fall short of meeting the invention defined by the other claims.

The claims that are rejected by the patent examiner may be amended, canceled or rewritten or an argument urging their allowance. Thus the claims that describe the invention in the least possible descriptive and limiting words.

LABORATORY PROCEDURE

Starting in this issue there will be published excerpts from the Signal Generator Handbook and shop notes prepared by the engineering staff of the Triumph Mfg. Company. This book, furnished with the Triumph Signal Generator, contains in condensed form valuable information, a definite procedure for attacking service operations by laboratory methods where such is advantageous. The laboratory practice is not directly applicable to the home technician. This booklet most apparently was prepared by men who not only know engineering, but also know how to repair radio sets. This manual may be secured free of charge by writing The Triumph Co.

SERVICE KINKS AND PET EQUIPMENT

EDITOR'S NOTE: Through the kindness and courtesy of Mr. H. K. Bradford, president of the Capitol Radio Research Laboratories, we are able to publish the following material taken from the workshop columns of the Duck Case Records of Broadcast Receiver Repairs.

ZENITH 750—DEAD

If the grids of the I.F. tubes become red hot look for a shorted I.F. transformer. This is caused very often by the lead coming in contact with the chassis. 

WESTINGHOUSE WR-5—IMPROVING SENSITIVITY

Remove the shield from the first I.F. transformer.

SPARTON 120—OSCILLATES WHEN WARM

If the receiver functions correctly until it becomes hot increase the value of the by-pass condensers across the cathode resistor. Sometimes it is necessary to employ a condenser as large as one microfarad to obtain stability.

R.C.A. R-74—INTERMITTENT, OSCILLATION & MOTORBOATING

This trouble is usually caused by a dirty contact between the rotors of the condensers and the chassis. Inspecting and cleaning the wiping contacts will clear the trouble.

ATWATER KENT 55—WEAK AND DISTORTED RECEPTION

Carefully test the two resistors shunted across the speaker field. Their center tap goes to the input transformer secondary center-tap.

CROSLEY 58, 59—HUM

Replace the 1 megohm resistor in the 47 series grid circuit which connects to the high voltage secondary tap.

ECHOPHONE S-3—IMPROVING

Replace the secondary grid voltage resistor with a 200,000 ohm unit. Also replace the 0.1 mfd. screen by-pass condenser, as it often causes trouble due to opening.

LYRIC J—DISTORTION

Usually caused by opening of the 500,000 ohm resistor near the power transformer. Replace with 250,000 ohm units in series.

MAJESTIC 20—SIZZLING AND FRYING

The tone control is usually responsible for this trouble. Open the chassis at the rear left side where the tone control is located and simply clip the condenser. For tone control replace this condenser with a .03 mfd. 600 volt tubular type.
READING SENSITIVITY OF RADIO RECEIVERS

By ENGINEERING STAFF, Triumph Mfg. Co.

Reading sensitivity of radio receivers is a very important measurement for many reasons. Perhaps one of the most important of which to the serviceman is that he may make measurements before and after servicing a receiver and thereby calculate definitely how much improvement he has accomplished in the sensitivity of the receiver.

Set up the receiver and connect the signal generator to antenna and ground binding posts of the set (it is usually considered good practice to use a standard dummy antenna in these tests). In the broadcast band, readings should be made at 600, 1000 and 1400 K. C. This is standard practice.

The Institute of Radio Engineers standards have been set so that 50 milliwatts output audio power is deemed Standard Output. The sensitivity of a receiver is output audio power is deemed Standards have been set so that 50 milliwatts as a rule.

Adjust the attenuator controls until the Standard Output reading is shown as mentioned above. This reading may be determined by referring to the table and transposing the voltage readings on the scale to the audio power reading corresponding to the voice coil impedance, then read and note the attenuator setting—let us assume it is 10 microvolts. Then the sensitivity of the receiver is 10 microvolts at 200 milliwatts, output at that particular frequency. As above stated these measurements should be made at 600 KC, 1000 KC and 1400 KC for the broadcast band.

### Table of Voltage Indication on High Impedance A.C. Voltmeter for Wattage Output

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<thead>
<tr>
<th>Voice Coil Impedance</th>
<th>.2 Watt</th>
<th>.5 Watt</th>
<th>1 Watt</th>
<th>3 Watt</th>
<th>5 Watt</th>
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<tr>
<td>2</td>
<td>.63v</td>
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In 1933 the expenditures of United States tourists in foreign countries amounted to about $292,000,000 as compared with $446,000,000 spent in 1932 and $821,000,000 in the peak year of 1929.
ELECTRICAL MEASURING INSTRUMENTS

By C. CLIFFORD ADAMS, Laboratory Superintendent
Quality Electric Company

(Continued from last month)

PART THREE

DYNAMOMETER INSTRUMENTS

When current is caused to flow in a conductor, there is set up about the conductor and on a plane perpendicular to it, a magnetic field which is proportional to the current flowing. If 2 conductors carrying current are placed near each other but not in parallel, the magnetic fields about them will react upon each other in such a manner as to tend to become parallel. The reacting force will be proportional to the field about the 2 conductors. The reaction is communicated to the conductors as a force tending to place them in a position parallel to each other.

In the Electrodynamometer type of instrument, the conductors are replaced by the field and moveable coils. The field coils are held in a fixed position. The moveable coil is pivoted so that its only possible motion is rotation. It is placed between the field coils. When current is caused to flow both the field and moveable coil circuits, the moveable coil will tend to rotate, the tendency being to place itself parallel with the field coil. The force causing this rotational motion is counter-balanced by the mechanical force exerted by the springs attached to the moveable coil staff. When a balance of forces occurs, the moveable coil motion is stopped and the coil retains its new position until a further change takes place in either the moveable coil or field coil currents. By having the pointer attached to the moving coil staff and properly calibrating scale on which the pointer will move, the instrument can be used for measuring the reaction effect of the coils upon one another.

If in a D.C. circuit the field coils are caused to carry the current of the circuit and the moveable coil has impressed on it the potential of the circuit, the instrument will indicate the product of the value of the current and voltage, which is the power of watts; since in a D.C circuit the instantaneous values of current and voltage are the same for all consecutive periods of time.

In an A.C. circuit the conditions are slightly different owing to the characteristics possessed by such a circuit, namely reactance. Reactance is caused by the presence of inductance or capacity in the circuit.

Instantaneous values of voltage and current are continually changing from a maximum positive to a maximum negative, passing through zero and all the intermediate values. This cycle is repeated, the frequency of repetition in a second determining the frequency of the circuit. This process is conveniently pictured by a curve known as a Sinusoid. If the circuit is composed of resistance only, the current and voltage sinusoids reach their maximum positive and negative points at the same instant and pass through zero simultaneously. By introducing inductive reactance in the circuit, the current curve reaches maximum at a time later than the voltage curve, the interval of time depending on the inductance and frequency of the circuit. This difference in time is expressed as an angle and is called phase displacement. Its effect on the power of the circuit is to reduce the value of the power for the same value of current and voltage as compared to the power in a purely resistance circuit. The power is represented by a curve derived by plotting the products of the instantaneous values of current and voltage. The wattmeter indicates the average value of these instantaneous values of power. The actual or time power is equivalent to the product of the volts and amperes multiplied by the power factor which is always less than one.

The wattmeter to indicate correctly an alternating, as well as direct current, must have the pointer actuated practically free from internal inductance. Therefore, great care must be taken in the design of the coils and their relation to one another as well as to the surrounding parts of the instrument, so that inductance is eliminated to the greatest possible extent.

In the Polyphase wattmeter there are 2 sets of field coils and 2 moveable coils mounted on the same staff, and pointer will indicate the product of the average instantaneous values of power in the polyphase circuit.

Dynamometer instruments are also made as ammeters and voltmeters. In ammeters the field coils are similar to those of the wattmeter but also have a resistance in series with them which carries the full current. The moving coil is connected across this resistance and gets its current from the drop produced by the current to be measured. In the voltmeters, the fields are wound with a greater number of turns and smaller wires than the ammeters or wattmeters field.
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IMPORTANT PHYSICS RESEARCH IN 1934

Professor J. Clay's experiments with cosmic ray measurements made at a depth of over 800 feet in the Red Sea supported the belief of Dr. W. F. G. Swann, Bell Telephone Research Foundation, Franklin Institute, that swift rays do not ionize matter they penetrate.

A Transmutation of elements was obtained by Irene Curie-Joliot and J. J. Joliot as a result of their discovery of artificial radioactivity. They later observed the emission of neutrons three hours after the bombardment of atoms.

Doctors B. Decaux and J. B. Calle, of the Paris Academy of Sciences observed a difference of almost 10 per cent between the steady daytime rate and the fluctuating night rate for the transmission or short radio waves.

A source of protons nine times as powerful as any previously known was found by Doctors E. S. Lamar and Overton Luhr of the Massachusetts Institute of Technology. This is an electric arc operating in hydrogen at low pressure between an incandescent filament and a neighboring metal electrode.

A Soviet scientist, Prof. Bonch-Bruevitch, experimenting at Murmansk, reported that the "radio roof" of the atmosphere has been found by Doctors E. S. Lamar and Overton Luhr of the Massachusetts Institute of Technology. This is an electric arc operating in hydrogen at low pressure between an incandescent filament and a neighboring metal electrode.

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The main problem, then, seems to be the ability on the part of the purchasing trade to spot this distress merchandise when it is offered for sale and if it be wise, shun it as it would a poison reptile, as in truth, the use of such products will quickly prove fatal to the success of any business enterprise.

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Tommaso E. Nikirk of Pacific Radio Exchange delivered a paper on Volume Indicators before the regular meeting of the Certified Radio Technicians Association, Monday, February 11. Mr. Nikirk's talk as well as being highly interesting and informative from the standpoint of a technical description of the development and engineering of volume level indicators was made even more appealing to the members and guests present by his demonstrations with actual equipment. This equipment included three different types of power level indicators, cathode ray oscilloscope, beat-frequency oscillator, a high frequency reproducer or "tweeter."

Preceding Mr. Nikirk's paper, Mr. Edwin H. Guifford, Educational Director of the CRTA and West Coast representative for the Capitol Radio Engineering Institute, delivered another talk in his series of lectures dealing with fundamental mathematics.

NEW TRUMH DISTRIBUTORS

The Triumph Manufacturing Company has recently appointed three new distributors in San Diego and two in Los Angeles. The Coast Electric Company and the West Coast Radio & Electric Company of San Diego and the Pacific Radio Exchange and M. D. Ealy of Los Angeles are now carrying a stock of Triumph equipment and are showing the new Model 400 Tube Tester.

The name California is the name of an imaginary island, very near an earthly paradise, in "Las Serges de Esplandian," a romance of chivalry written in the first few years of the sixteenth century. The name was bestowed upon this territory by the Spanish Conquistadores.

CARRON CONE LINE COMPLETE

Electric Products Service, local distributors for Carron replacement speaker cone line, advise us that in addition to their large stock of over a hundred different types, they now have a large shipment in transit which will enable the line covering practically every make and type of cones in use today. We understand this will be the most complete speaker cone stock available to the service man west of Chicago and highly commend him on making complete facilities available to the service men of this territory. Complete listings of these cones may be obtained from the Electric Products Service.

RESECTOR STUDIES

(Continued from page 9)

the usual molded resistor. In fact, a cross-section of the new resistor structure resembles that of a gun forging. The current-carrying area is large and non-magnetic, and can be determined by the electrical characteristics.

A study of these new units under mechanical loads indicates that the resistance value remains constant, which is of significant fact. Microscopic study under normal and excessive wattages fails to disclose any light points or point-contacts with excessive microscopic current density.

The method of attaching terminals or ends to these extruded lengths has also been the subject of long technical study and engineering development. It was desired from the start to secure a uniform and positive area of contact and then place on this area a metal surface which in itself would have sufficient strength and rigidity to be fully dependable. The coating of the ends of the rod with fine particles of metal has achieved the first goal. The second has been met by placing on the end of each rod, the metal-coated surface, a solid piece of metal, in the form of a cap to which the pigtail is integrally attached.

In physical appearance the new resistors present a solid extruded mass—homogeneous, rock-hard and conductor throughout. The surface is velvety smooth and provides ideal heat radiation. Diameter and length remain uniform over wide range of resistance values.

Wattage ratings are exceptionally conservative since sizes have been kept standard rather than reduce the bulk in keeping with the greater wattage dissipation of the unique cones. Units have been in actual existence and on test for several years, and in final form for more than one year. The most exhaustive tests have been applied. All loading has been applied initially at double wattage, with no effect on the value of the unit. In loaded tests have been applied in the presence of elevated temperatures, yet the units have shown no change in temperature coefficient which is practically negligible at any operating temperature. A 1000-hour steam box test for moisture variation indicates a change of 0.1 per cent in resistance value whereas 15 per cent variation is not unusual. The noise component is well below the average of non-wire resistors. Life tests indicate exceptionally long service life, with very gradual and practically negligible change in resistance.

DISTRESS MERCHANDISE

(Continued from page 5)

either old or new, and the racketeering group to which we have been referring. Their methods of doing business, their price structures, their media of advertising, their willingness to serve the trade, all tend to indicate their true standing in the industry. In the past when business has been none too brisk, it most certainly has been a great temptation to manufacturers and dealers for radio receiving equipment to employ parts which, although represented as standard, are offered at considerably lower prices than those to which the trade has become accustomed. However, by bitter experience it has been learned that attempting to increase the margin of profit by such methods actually reduces overall profits.

The industry then, as a whole, must combine in an effort to stamp out this practice of misrepresenting radio merchandise and creating its own devaluation of the trade by using a few cents extra margin as bait. Particularly from the standpoint of the service technician, the continued satisfaction of customers important. Repeat business in the service field is the keynote of success and profit. Only by using first-class merchandise and conscientious effort combined with technical knowledge, can this end be accomplished.

The main problem then, seems to be the ability on the part of the purchasing trade to spot this distress merchandise when it is offered for sale and if it be wise, shun it as it would a poison reptile, as in truth, the use of such products will quickly prove fatal to the success of any business enterprise.

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TRAVELING THE TERRITORY WITH MILTON

And once again, friends and people, we're off to a flying start around the territory. Are you travelin'?

To Philip Johnson, who holds down the service fort at Hancock Music in Pasadena, we are indebted for this hypothetical question. "Phil" asks: How many letters are there in the average word, and, if so, how many words in the average letter?

They tell us that Bill May, out at San Bernardino Furniture in San Berdo, is feeling 20 pounds lighter. Yesir, Bill just had a wisdom tooth removed, and is now displaying his operation to all and sundry who exhibit sufficient interest to go exploring.

The news has been brought to us that Ray Rusthoi, of Manhattan Radio Shop in Manhattan Beach, is about to become a papa. We're waiting for those cigars you'll be passing around, Ray!

We doff our hat in respect and admiration to Miss Rita Galluch, whose knowledge of transcriptions is well appreciated at the Famar Recording Studios on Hollywood Blvd. This capable person not only can make recordings of entire orchestras and choirs, but can install coupling transformers in an amplifier line even though the only instructions available are verbal ones over the telephone. Look to your laries, men; a modern Portia is in our midst!

When walking into Lovinger's Radio Studio on North La Brea, one wonders whether he is in a radio store or in some comfortable living room. To make things feel quite "at home" there is the aquarium with rare imported specimens of water life; and off to the left is Polly the Parrot, which, just like a microphone, feels still more comfortable living room. To make things feel 2 degrees Fahrenheit or Centigrade, certain instructions for the installation of recording needles stated that one type of needle must be installed in pickups at 2 degrees from vertical. "Bill" still is undecided as to whether it should be 2 degrees Fahrenheit or Centigrade.

El Viajero se vale de esta oportunidad para saludar a sus muy apreciables amigos en la casa Calderon. Muy buenos dias, senores; y muy buenas las noches también.

Kenneth Landgraf of the BT Radio Shop has the right idea. Just like the man who buys his wife a washing machine so that she can take in washing, so has "K. G." bought a new set of equipment which "the Missus" can read so that she can repair the sets he brings to the shop. It's a system, that's what it is, it's a system.

From now on "Pat" Breyde's, whose little shop is located out West Adams way, will depend on matches for lighting his tobacco. As Pat touches the tender tip of his nose, he ruefully admits that somehow these improvised lighters just don't seem to want to work.

Word comes to us from the Arcade Radio Shop over the ocean waves at Catalina that Andy Baylor has been teaching table etiquette to perspiring radio servicemen. More competition for Emily Post!

It seems that Johnny Scales, who watches over Miss Rita Galluch, has gone 5 meter conscious. Johnny's one ambition now is to put KFWB on the air on 5 meters just to show that great oaks from little trees do grow.

And so long, people! Here's hoping that the fasting and abstinence during the Lenten season won't reduce the appetites too much. Hasta luego!

MIKE SENSITIVITY

Three different degrees of sensitiveness for microphones is even more necessary now than it was a few years ago, say officials of the Universal Microphone Co. at Inglewood, Calif., a firm which has pioneered in the field of microphones from instruments "tailored and designed" for individual use, to the "mass production" of standard military type. There are three degrees for Universal instruments... M for medium, S for sensitive and D for damped.

Microphones, point out Universal engineers, cannot be made to perform all functions perfectly. Microphones of certain grade and quality, even with the utmost in frequency response, cannot be made for use in a P. A. system and then changed to studio or recording use and function properly in all cases.

Sylvana in Field

Hygrade Sylvana Corporation is happy to announce the appointment of Mr. W. G. Patterson, who will be in the California territory cooperating with the factory and Mr. E. P. Demorest of Sylvana-Pacific Company in sales promotion work.

Mr. Patterson's work will be largely devoted to the junior territory and it is felt that his cooperation will make the tie between the dealer and Hygrade Sylvana Corporation still stronger.

We respectfully solicit your patronage.

Leo J. Meyberg
Company, Inc.
335 W. Washington Blvd.
Los Angeles
Prospect 9255

TECHNICAL QUESTION AND ANSWER DEPARTMENT

Conducted by CHARLES MILLER

Q: Can two electrolytic condensers be used in series for replacement in high voltage packs?

A. It is a risky practice at best. If electrolytics must be used in series, each should be shunted by a 50M to 100M resistor to divide the voltage equally between sections.

Q: I have a Splitdorf using a single 81 rectifier. Although the tube is OK and the transformer is putting out rated AC plate voltage, the B voltage is only 125 volts.

A. Check for an open condenser at the input to the filter.

Q: I have a capacity meter calibrated for 60 cycles. Would the calibration hold if I were to use a 5:6 ratio auto-transformer to raise the line voltage for use on 50 cycles?

A. The calibration should be sufficiently accurate for ordinary service measurements.

THE COVER THIS MONTH

The typewritten portrait of Abraham Lincoln appearing on the cover of this issue of "The Technician" brings to light unexpected talent of Mr. Paul Jr., President of the Certified Radio Technicians Association. Investigation revealed the fact that similar portraits by Mr. Paul previously appeared regularly in the Hearst papers, Motion Picture Magazine and other publications. We are sure you will agree that this work is most interesting and, of course, we are always glad to note unusual accomplishments of radio men and members of the local radio industry.
Radio Interference Bureau

Mr. W. F. Grimes, Chief Engineer Radio Interference Engineering Bureau

(This column is a regular feature and each month will consist of a report of interesting cases and activities of the RADIO INTERFERENCE ENGINEERING BUREAU. To report interference Phone Trinity 1244.)

During the year 1934 this Bureau investigated 3,455 reported conditions of unsatisfactory radio reception. It is interesting to note that a majority of the conditions found responsible for poor radio reception fall in three (3) groups.

There were 639 cases of receiver trouble which consisted, in general, of defective tubes, defective condenser assemblies, misalignment of amplifier stages, defective resistors and condensers, and one or two cases involved crystal detectors.

There were 697 cases of incorrect installation, a great many of which were due to the fact that the receiver was being used with no antenna whatever or the antenna binding post was connected directly to a ground.

There were 500 cases of trouble involving power equipment, practically all of which have been cleared by the power companies involved and rechecks have indicated that the trouble cleared.

The remaining located sources of trouble are of interest in that a very considerable number were traced to thermostats used for operating sign flashers, heating pads, fish warmers and other types of temperature regulators.

“AGE IS NOTICEABLE ON THE INSIDE OF THE HEAD AND NOT ON THE OUTSIDE”

Today employers ask, “What do you know?” rather than “What is your age?” A good point to remember always is that age is noticeable on the inside of the head and not on the outside. Forget your age. You are as old as you feel. The only important thing of consequence is whether you are ready to accept responsibility.

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In all its branches
Most completely diversified stock in the West

Distributors of nationally known lines
Parts — Supplies — Sound Equipment
Tubes — Amplifiers — Test Apparatus

Packard-Bell Co.

Los Angeles
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GLENDALE DEALERS
At the monthly meeting of the Radio Service Dealers of Glendale, held on Tuesday evening, Jan. 29, five new members were sworn in to the oath and signed up. A large turnout was a surprise to the chairman and 28 of the 30 members were present.

The business of the evening consisted of a vote on whether or not to increase service charges in Glendale City limits from 75 cents to $1.00, a two-thirds vote was for retaining the present 75 cent fee. John L. Vincent stressed the necessity to affiliate with the CRTA in view of the forthcoming license for Technicians.

The matter of identification of shops was discussed, Vincent offered the suggestion of numbering each shop permanently, such number to be used in marking work estimates on chassis for repairs. The numbers were drawn and recorded, a number within a ring for each shop having estimated on a job.

Members agreed that to discuss the job as done by a competitor, was out of order unless details or conditions affecting the job were known and then the customer was to be informed in a manner not detrimental to the competitive shop.

G-H POPULAR
The line of paper replacements for electrolytic condensers by the Girard-Hopkins Company of Oakland, California, has proven very popular with service technicians. These units, which will stand a surprising peak voltage are exact duplicates in the matter of size and filtering ability and have the advantage of not drying up or losing their value with age. This company produces a full line of such replacements which are handled by all leading jobbers.

CASH SWINNEY RECOVERING
Cash Swinney, well-known and loyal CRTA member, who was severely injured recently, is reported to be on the road to recovery. Although his injuries were painful and rather extensive, he is past the danger point and is receiving visitors. He will be confined to bed at the Queen of the Angeles Hospital for some time and will greatly appreciate visits from his friends and fellow members.

NEW TYPES OF METERS
Electric Products Service factory service and distributors for Triplett instruments advise that two new instrument types are now available in the line. First the double instrument as used by Triplett in their new Model 1200 volt-ohmmeter is now available as a separate double instrument, and can be had in either the two movement ranges as used in the volt-ohmmeter unit, or in any other combination of movements either AC or DC. Thus allowing one to group any two instruments in one dual case. Second, a new model Square case instrument known as the model 421 series. The flush mounting case measures approximately four inches square and provides the same scale length that was heretofore only obtainable in five inch and larger types of meters. This line is obtainable in all ranges the same as the model 321 round case.

NEW PACKARD-BELL
Packard-Bell announces a new 5-tube superhetrodyne with many outstanding features at a surprising list price. This new 5-tube super is housed in an especially designed and attractive walnut cabinet, is equipped with tone control, airplane dial, automatic volume control and other modern improvements. It should enjoy extensive sales.

HAND-EE Grinder
quicker better jobs
Weighs 1 pound. Plug in any light socket and do 1001 jobs.

Do away with slow hand work. Grinds, routs, drills, carves, sharpens, cuts, engraves.

For shop, home or tool kit. (Model A), A. C. or D. C. operation, 110v., 13,000 r. p.m. Order on 5-day trial. Satisfaction guaranteed.

NEW Master Craftsman's Set-17 useful accessories to grind, drill, polish, sand, cut, carve, engrave etc. . . Prepaid $5.00.

DEPENDABLE METER SERVICE
On All Makes and Types of Instruments

FACTORY SERVICE FOR
Supreme — Triplett — Dayrad — Clough-Brengle
Complete Stock of Latest Type Meters and Test Equipment

ELECTRIC PRODUCTS SERVICE
1358 S. Grand Ave., Los Angeles PROspect 3681

Chicago Wheel & Mfg. Co.
112 SOUTH ABERDEEN STREET
CHICAGO, ILL.
CHANGING A HOUSE SET (RCA-VICTOR R-28-P) TO AN AUTO RADIO
By W. F. DALEY

EDITOR'S NOTE:—The following is a description of an interesting experiment in re-wiring a standard 5-tube superhet erodrome for use as an automobile receiver. The experimental model was designed for use with a 12-volt system but a different connection of the filament would adapt it for use for any D-C voltage.

The first thing to do is to pull a five-prong socket in place of the four-prong connection for the rectifying tube, 84. The cathode connection goes to the high voltage transformer secondary and the secondary lead going to the plates of the 84, across which is connected the 1,000 volt .0001 mfd. condenser. The condenser is for the purpose of by-passing the R.F. generated in the secondary before the 84 gets heated up throwing a load on the secondary. The R.F. might burn some of the insulation by arcing in the transformer and cause trouble or noisy reception sometime.

The next thing is to arrange the filament circuit to operate on the car battery. The experimental model was designed for a twelve-volt system so the filament circuit was adapted to that voltage using the circuit as shown. The resulting voltage across each tube being 2.5 to 2.75 volts excepting in the case of the 84 tube there is about 5.5 volts.

This circuit is fundamentally a series circuit. The law for a series circuit states that THE CURRENT THROUGHOUT THE SERIES CIRCUIT IS THE SAME. We know that the 57 and 58 each must have one ampe, the 2A7 0.8 ampe, the 2A5 1.75 ampe and the 84 0.5 ampe. The 57 and 58 tubes were put in series, and the 84 tube and resistor R1 in parallel with them so they would take 1.75 ampe: 2A7 in series with that combination with resistor R1, in parallel. The 2A5 will take 1.75 ampe. The 2A5 is put in series with the rest of them. The total current taken by the tube filaments is 1.75 ampe.

The next thing of consideration is the "B" eliminator that will work on 12 volts. About every shop can find a spark coil in the old junk box. Solder a wire shorting the secondary of the spark coil. Then connect the 2.5 volt windings and the 5.0 volt windings of the power transformer in series, making sure that said windings are connected in the proper relation to each other so that they will not buck one another. Then the battery is connected to the power transformer as shown, and the other end of the coil is grounded. The spark coil should be completely shielded. Put it in a can and pack with sound absorbent material in order to deaden the mechanical vibrations set up by the sparking. The lead coming from the spark coil should be by-passed by a 0.25 mfd. condenser to filter the R.F. generated by the vibrator and the shield should be grounded to the set. You can easily adjust the vibrator for the least amount of noise, least current consumption and greatest output of current by adjusting the vibrator nut. The vibrator adjustment is not critical.

The battery current coming to the set passes through the switch on the back of the volume control before it reaches the filaments and power transformer.

RADIO SPECIALTIES TAKES RAYTHEON

The Radio Specialties Company announces its appointment as distributor of Raytheon 4-Pillar Tubes. The company is carrying a complete stock and will be most happy to discuss the attractive terms with its customers. Drop in or ask for any Radio Specialties salesmen for a copy of the new Raytheon Technical Data Chart. It is one of the most complete and informative charts of its kind available. Radio Specialties will be glad to supply this chart free of charge to those who inquire.

ELECTRICAL MEASURING INSTRUMENTS

(Continued from page 14)

Further accentuation of the compactness for which the electrolytic type condenser is already renowned is made possible by an ingenious concentric winding for multiple-section units, according to Howard Rhodes, Chief Engineer of the Aerovox Corporation.

"A further reduction in the physical sizes of electrolytic condensers is brought about by winding two or more sections into a single roll," states Mr. Rhodes. "If there is a common negative terminal for two or more condenser sections composing the concentric unit, then the condenser is referred to as being 'centrically wound common negative'. If there is a common positive terminal for the sections, the resulting unit is termed as 'centrically wound common positive'."

N. U. EXECUTIVE

Mr. Hutchins, vice-president of the National Union Radio Tube Company, was a recent visitor to Los Angeles and attended the CRTA meeting, Monday evening. Following the meeting Mr. Hutchins addressed the CRTA for a few minutes on the subject of merchandising and selling service. His straightforward manner and pleasant personality caused him to be a visitor to the CRTA which members will not soon forget.

TUBE CHECKERS and—SET ANALYZERS

Repaired or Rebuilt
All types of instruments Repaired or Calibrated Shunts or Multipliers made up for any instrument PROMPT — ACCURATE RELIABLE SERVICE Authorized Service Laboratory for Weston Electrical Instrument Corp.

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Classified Advertisements

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EDISON phonograph with diamond needle and 45 records. All in first-class condition. Archie E. Clark, 510 E. Stanford Ave., Garden Grove, Calif. Phone 720.


For Sale—

COMPLETE public address system, composed of the following: Class B 46 amplifier, 3 stage TRF tuner, Western Electric Double Button Mike, stand and 30 feet of cord. "T" Fader for Radio, Mike and Phonograph. 10" Jensen Speaker with baffle. Thordarson Transformers used throughout. Practically new. Will sell for $100, $50 down, balance in 60 days. Also three-year file, QST, 1929, 1930, 1931. all in good shape. Sell for $3. Archie Clark, 510 E. Stanford Ave., Garden Grove, Calif., Phone 720.

Laboratory Service—

All types of laboratory measurements and calibration of electronic devices and component parts. Dr. John F. Blackburn, Consulting Physicist. Granite 8179.

34,000 Service Men Have Sent for This Book

Get your copy for 10c

- Yes! 34,000 radio service men have learned the way to take the guess work out of tube application... because that's how many have sent for this latest Sylvania service help, a complete technical manual, with 104 pages crammed full of useful information.

This book will increase your profits, because in it you will find the latest technical pointers that are so necessary for your job. When you've studied this book, you'll find it far easier to recognize tube and set troubles... and more important... how to solve these problems to get fine, sure performance.

Complete data on all tubes are included in this booklet, including types 15, 18, 25S, 25Y5, 46B1 and 182B. It also gives descriptions of over 90 types of tubes, with 150 cuts and diagrams.

You'll find this book so useful that you wouldn't take $10 for it once you've looked through it, and yet it's yours for only 10c in stamps! Send today... and begin now to take advantage of this new Sylvania service help.

Grumow

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Please send me the new Sylvania Technical Manual. I enclose 10c in stamps.

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A NEW OPPORTUNITY FOR C. R. T. A. MEMBERS

A. Paul, Jr., President, CRTA

Members of the Certified Radio Technicians Association will be interested to learn that the National Schools, at Figueras and Santa Barbara streets, are sponsoring a special course in instruction in radio for members of the association.

The training is to be given without charge, to members of this organization with the compliments of Mr. J. A. Rosenkranz, President.

The subjects dealt with at the meetings are to be arranged according to the preferences of those who attend. In other words, the members are to be given their choice of material to be presented so that the various subjects covered will be most closely related to their daily work.

The class will meet every two weeks at 8 o'clock, on Monday evenings. The first class will meet on Monday evening, March 25.

In addition to the class work, the school offers consultation privileges. Any question may be noted on a post card and mailed to the school. It will be completely answered at the next meeting.

Inasmuch as the National Schools have been so gracious as to place the facilities of their institution at our disposal in this way, it is hoped and expected that every member will show his appreciation by taking advantage of the opportunity.

These meetings will be helpful to everyone attending. The National Schools have long been known for the complete and practical nature of their training. The school instructors who will direct this special course are regular members of the National faculty. They understand the subject from beginning to end, and just as important, they are experienced in the art of directing the work of others.

NEW TROYS

The Troy Radio Mfg. Company announces a 1935 line of Troy radio receivers including 4 to 12-tube, all-wave, A-C, D-C, AC-DC, air-cell battery and 32-volt types in table and console cabinets featuring the airplane dial. New circulars are available showing in detail the complete line of receivers manufactured by Troy, one of the most complete lines of its kind on the Pacific Coast.

MEYBERG PARTS DEPT.

The Leo J. Meyberg Company has installed a complete parts department, featuring RCA Factory Parts and Test Equipment and many other well-known parts lines, including: Aerovox, Tube, Kenyon, General Transformer, Ohmite, Centralab, Carter and many others. They are also stocking Weston, Dayrad and Supreme test equipment.

NEW RACKS AND PANELS

The Pacific Radio Exchange announces many additions and improvements to its attractive line of racks and panels for construction of all types of amplifiers, transmitters and test equipment. The additions include crackle-finish portable equipment cases in various sizes and with a large variety of panel and chassis types. Panels are available for the racks either plain, perforated or with tube and meter holes.

NEW — 1935 ALL-WAVE SETS

"Western made for Western Reception"

METER AND TEST EQUIPMENT HEADQUARTERS

All the Latest Types in Stock

SUPREME — TRIPLETT — TRIUMPH — BEEDE
CLOUGH-BRENGLE — DAYRAD
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Distributed and Serviced by

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1358 S. Grand Ave., Los Angeles
Prospect 3681

February, 1935

AT LAST!

A POPULAR PRICED TUBE TESTER THAT READS —

Dynamic Mutual Conductance

THE MODEL 400 TUBE TESTER BY TRIUMPH

Neon Leakage Indicator Shows Leaks as High as 3 to 5 Megohms
Individual Element Short Test — Space Socket
Needs No Line Regulator Between 100 and 120 Volts
Separate Tests on Diode or Triode Sections of Multi-Purpose Tubes
Tests All Rectifiers — Simple to Operate
Beautiful Appearance — Counter and Portable Styles
Also Provides Emission Test

A REAL TUBE MERCHANDISER

At a Price Which Makes It Possible for Every Business and Every Technician to Possess a Real

DYNAMIC MUTUAL CONDUCTANCE TESTER

CALIF. NET PRICE $36.20 PORTABLE or COUNTER

A Price All Can Afford — A Tube Tester for the Most Exacting

REDUCED PRICE!

To enable all progressive technicians, service laboratories and factories to avail themselves of the use of a real laboratory signal generator the Triumph Model 100 Generator has been reduced to the Very Low NET PRICE OF $31.25 DELIVERED

This Generator Is Being Used in the Laboratories and on the Production lines of Leading National and California Manufacturers and in Research Laboratories.

WRITE FOR YOUR FREE COPY OF THE

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See These Distributors for Demonstrations

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WESTERN RADIO & ELECTRIC CO., San Diego
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California Representative:

NORMAN B. NEELY, 1655 North Serrano Street, Los Angeles