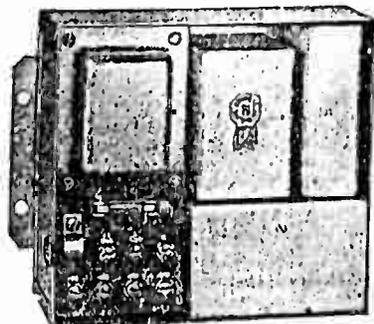


AUTO-RADIO MULTI-TAP "B" POWER SUPPLY UNIT ONLY 1 MODEL MULTI-TAP "B"



ALWAYS READY

With the Multi-Tap "B" you have no dead "B" batteries to worry about when you want to turn on the radio—full voltage is always there when you turn the radio switch. The Multi-Tap full wave auto radio "B" supplies smooth, quiet, constant "B" power output voltage from the 6-volt storage battery—produces greater distance finding and continuous clearer tonal quality.

REPLACES B BATTERIES IN OVER 90% OF AUTO RADIOS
Radios now in autos, motor boats and aircraft operating with varying power "B" batteries can be permanently modernized with Multi-Tap "B" — A ripe field for service engineers—and distributors.

Multi-Tap "B" provides 90v, 135v, 180v or 250v at various taps on the connecting block shown in the illustration.

The vibrator assembly is self-contained—housed in a low resistance non-magnetic metal case—no liability of mechanical injury nor springs getting out of adjustment. The inner vibrator case is floated and completely enclosed in a sound absorbing sponge rubber container which in turn mounts in an additional shielding metal case. This double shielded construction of the General Vibrator eliminates all disturbing vibrator noises.

Unit is free from annoying hum and R. F. disturbances. The output is completely filtered, eliminating interference and feed-back.

The Multi-Tap "B" has all parts and wiring securely mounted directly on the chassis which is housed in a strong steel cadmium plated cabinet. The chassis is not fastened to the cabinet but is a snug fit and is securely held in place by the cabinet cover which is clamped with four sturdy self-tapping screws—6-32 thread.

The Multi-Tap "B" is supplied complete with connecting cable ready for easy installation. Full directions with each "B."

FREE FOR THE ASKING!

Send for Auto-Radio Multi-Tap "B" Bulletin.

GENERAL TRANSFORMER CORPORATION

512 South Throop Street, Chicago Ill.

DISTRIBUTORS:

Radio Supply Co. Radio-Television Supply Co.
A. E. Ravenscroft Herbert H. Horn

The "TECHNICIAN"

Official Publication of the Certified Radio Technicians' Association
An Organization of Competent, Qualified and Trustworthy Radio Technicians for the Purpose of Advancing the Radio Art and for the Protection of the Public.

A. PAUL, Jr., President

JOHN L. VINCENT, Vice-President

JOHN A. ORME
Secretary-Treasurer



Editor - Manager
NORMAN B. NEELY
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Los Angeles, California

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VOL. 1

MAY, 1934

No. 9

EDITORIAL

By The Editor

"What Price News?"

The evolution of broadcast radio during the past decade has been truly astounding. From a technical viewpoint this evolution has created many new professions. Design engineers, testers, set builders, broadcast operators and engineers, service technicians and all the other miscellaneous employees in this vast and wonderful field earn their daily bread in the radio industry. People unable, either financially, physically, or by lack of time to personally attend the many worthwhile, entertaining and educational programs, and world famous sports events are no longer deprived of these pleasures and opportunities.

To be at the ring side of a great fight, on the fifty yard line of a famous football game, or behind the "plate" of a championship baseball game, at the return of famous heroes, in an orchestra seat at operas and lectures is now possible by the mere turn of a dial.

We may learn to cook, sew, fish, hunt, speak foreign languages, improve our health and numerous other things through the medium of radio. Undoubtedly one of the most valuable of all these services is the broadcast of last minute authentic news, while it is still news. Think of the untold joy and comfort to the blind and disabled, to the people out of contact with large centers of population, to men and women who have no time to struggle through the unnecessary display of literary art on the part of reporters and rewrite men in order to find a fact which, simply stated, consists only of a few

words, brought by means of radio news broadcasts.

Think of the listeners—they are the customers of the service technicians and dealers. These customers have an investment in equipment and they must maintain it. Are they not entitled to receive the programs of news as offered by the broadcasters without the interference of selfish and monopolistic interests?

KNX, Southern California's leading broadcasting station, has taken a definite stand to fight in the interests of its listeners—our customers. This station is noted for its policy of presenting news frequently, concisely and authentically. It is one of the very few news mediums which fearlessly gives all sides of any question regardless of results. Our customers are entitled to know the facts free from political influence and coercion by editorial policies controlled by capitalistic interests and grafting politics.

Our large newspapers have endeavored to prevent these broadcasts of true facts by an unbiased agency. KNX has always kept its advertising clean and legitimate. What about our large newspapers who print page after page of misleading and deceiving bait advertising? Not only in the field of radio but in all lines of business. Full page advertisements by cut-rate concerns who offer products at less than legitimate dealer cost are daily features. These newspapers, subsidized by chiseling capitalists accuse KNX of chiseling in the business of distributing news. Who are they to cry "Chiseler"?

(Continued on page 10)

MULTI-TAP "B" POWER SUPPLY UNIT FOR AUTO RADIO SETS

* By G. McL. COLE

Spring is here! No question about it—the red flannel undies have been itching for some days now. Spring is here and Summer—auto radio time—is not far behind.

Auto radio time, this year, represents a tremendously potential field of revenue for the alert service man. Several reliable sources estimate in excess of one-half million auto radio receivers now in use whose "B" power is supplied from batteries. Unquestionably, the time is ripe for modernizing of these half-million sets with efficient "B" supply units. A thorough working knowledge of vibrator type units, their characteristics, method of installation and what makes them buzz is imperative.

Two styles of "B" supply units are prevalent—the tube type using an 84 tube for rectification and the other, a self-rectifying unit which uses an additional set of contacts in synchronism with the breaker contacts to rectify. All modern units are full-wave so we will not mention half-wave rectifiers. A tube type unit will be broken into to see what makes the wheels go round.

Of particular interest is the complete shielding of each major component part. Naturally the pack is shielded in its entirety by the container. The vibrator is of the plug-in type and special attention is called to the six prong mounting which holds the unit rigid and eliminates any possibility of coming loose no matter how rough the road. All parts are mounted directly on the chassis, which chassis is not fastened to the cabinet but being a snug

fit all around and is held in by the cover which is held on with four sturdy self-tapping screws. These screws have a standard 6-32 thread so that should they become lost any 6-32 screw will do the trick. Should it be necessary, for any reason to examine the unit it is merely

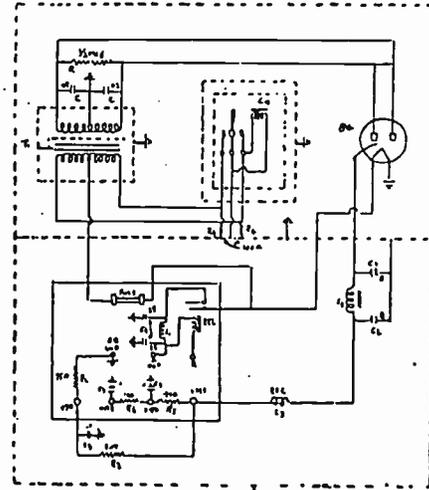


Figure 1

a matter of taking out the four cover screws, removing the cover and lifting out the chassis. This does away with becoming a contortionist while servicing if the unit is mounted under the dash board or other especially convenient spot.

The complete wiring diagram is shown (Continued on page 14)

Radio Institute of Calif.

1117 Venice Boulevard - DRexel 6753

AN ADVANCED COURSE OF TRAINING IN RADIO ENGINEERING
AND APPLIED MATHEMATICS

for the Service Man who wishes to advance in his profession.

We extend a cordial invitation to visit the school.

Mention The "Technician" when answering advertisements—It identifies you.

PRIZE CONTEST

Every reader of The "TECHNICIAN" will be interested in competing for the many attractive prizes offered by local distributors and manufacturers' agents, in this contest.

The rules are simple and easy to follow and nearly every technician has at least one or two ideas or pieces of apparatus which will be of interest to other readers.

The judges are so well-known and qualified in the field of radio engineering in Southern California that they need no introduction.

Rules

1. No manuscripts will be returned.
2. Entries must not contain more than one thousand words.
3. Entries must be typed and double spaced.
4. Articles may be either of a constructional or theoretical nature but must pertain to technical radio.
5. The name and address of the contestant must appear in the upper right hand corner of each page of the manuscript.
6. Diagrams must be in black ink on white paper and in suitable form for direct reproduction. (Maximum space for cuts in any one article is one-half page).
7. All readers of this magazine are eligible to participate except members of the firms offering prizes and the editorial staff of The "TECHNICIAN."
8. All entries must be addressed to Contest Editor, %The "Technician," 1569 Munson Ave., Los Angeles, Calif. They must be post marked not later than midnight, July 2, 1934
9. The judges' decisions will be considered final.
10. All manuscripts will become the property of The "Technician," to be used at the discretion of the Editorial staff.
11. The winners will be announced in the July issue of The "Technician."
12. Plagiarism is a serious offence. Do not copy other printed manuscripts and represent them as your own.
13. The failure to comply in any way with any of these rules will disqualify the manuscript.

Prizes

First Prize—Offered by Radio Specialties Co., 1816 West 8th Street.

Pioneer Gen-E-Motor Type W. 250 volts at 50 M. A. The new small size for replacement of vibrator units. May be used as complete power supply by addition of a filter. List price, \$13.00.

Second Prize—To be awarded by Thomas B. Pritchard, California Sales Agent for the Arcturus Radio Tube Company.

\$10.00 (List) worth of Arcturus tubes to be selected by the winner.

Third Prize—To be given by Mr. Bill Hitt, factory representative of the General Transformer Corporation of Chicago.

A universal replacement power transformer for five and six tube sets. This transformer is part of the universal replacement kit manufactured by the General Transformer Corp. List price, \$6.00.

Fourth Prize—Given by Radio "DOC," located at 721 South Main Street.

No. 142 Jackson soldering iron. This is the handy and useful one hundred watt model so popular with all service technicians. List price, \$4.00.

Entrance Prizes—Every person entering the contest will be given a copy of the "Check List of American Vacuum Tubes," as compiled by Dr. John F. Blackburn, Consulting Physicist, of Hollywood. These lists consist of a 7-page reference summary of all American tubes, including Western Electric, General Electric, Westinghouse Electric and Manufacturing Co., and Federal types. These lists will be given by The "Technician."

Judges

Mr. Richard G. Leitner Mr. W. F. Grines
Dr. John F. Blackburn Mr. C. E. Miller
Mr. J. L. Mahon

VALUABLE DATA GIVEN CRTA BY DISTRIBUTOR

At a meeting of the CRTA Monday evening, May 7th, Al Sexton, of the Radio Products Sales Co., presented each of the members and guests present a very valuable four page treatise and chart on resistor replacements. This chart will enable technicians to save time and turn out better repairs involving resistance replacements.

This company announces a new bulletin to be out soon which will contain many summer specials of interest to dealers and service men.

TUBE TESTING FROM THE SERVICE VIEWPOINT

BY J. L. MAHON, Sylvania Tube Distributor.

A paper presented before the L. A. Section of the Institute of Radio Engineers Mar. 26.

PART TWO

The use of triodes in self-rectifying circuits in transmitters suggested an inexpensive means of testing tubes. The plate voltage was raw A. C. from a transformer, and a D.C. milliammeter read the average D. C. plate current that the tube passed on the positive half of the cycle. Self bias for the tubes was the natural way of preventing excessive emission. Reducing the minus bias by shorting out a portion of the bias resistor or shifting the connection of the grid return from the minus end to the filament end would increase the plate current. The increase in plate current was assumed to be roughly proportional to transconductance. There are, however, several factors connected with this general form of circuit that tend to make this assumption far from true. In practice it results that tubes with impaired transconductance approximate so closely the values for good tubes that the test is of questionable value. The most important of these factors is the reflex action on the circuit due to self biasing. A tube that normally passes low plate current would be operating with less negative bias owing to a lower IR drop in the bias resistor. This tends to produce a general leveling action on all results. The same effect is noted, but to a lessened degree, by the ballasting action of resistors placed in the plate circuit. The resistors are for the purpose of protecting indicating instruments from overloads caused by shorted tube elements. Another fault of this type of circuit is due to the fact that the meter is reading the average value of plate current passed on the positive halves of the cycle and integrated over the whole cycle, whereas we are really concerned with the ability of the cathode to furnish a peak current of 2.707 times this average value. The failure to furnish this peak current would result in waveform distortion in the operation of the tube. A lowering in the peak can be quite appreciable before it is enough to affect the average by a measurable amount.

Tube testers on the market today using the grid shift method have overcome some of the most important difficulties mentioned. The reflex action is overcome

by using a fixed bias from a winding provided for that purpose, the connections so phased that the grid is negative in respect to the cathode, while the plate potential is undergoing the positive cycle. The change in grid voltage is accomplished by connecting the grid return to another fixed tap on the bias winding.

Regulation in the circuit is kept at a minimum by using tapped primaries on the power transformer for adjusting line variations. Since the steady plate current in the plate circuit does not enter into the final result, but rather the change, the initial reading is eliminated in one of two ways: (1) by producing a counter-current through the meter with a contact rectifier and adjustable resistor, together with a source of A. C. voltage provided by a winding on the power transformer, or (2) a mechanical bias is provided in the mechanism of the meter subject to manual control. In either case the final reading obtained is the change in plate current for a given change in grid voltage, and is closely proportional to the static value of transconductance.

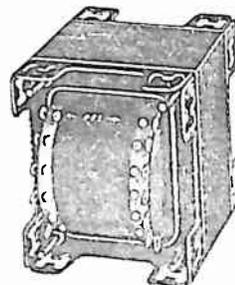
The dynamic value of transconductance is approximated in several makes of equipment on the market in the following manner. The tube under test is supplied with the proper D. C. voltages from a self-contained power pack with adjustments to provide for the normal operating values. A small appropriate A. C. voltage is introduced in the grid circuit and the tube becomes a virtual stage of amplification. The A. C. component of the plate current is read by either a dynamometer type or rectifier type A. C. milliammeter. The closeness with which this method approximates the dynamic transconductance depends on the load impedance of the plate circuit. By keeping the impedance of the indicating instrument very low in comparison with the plate resistance of the tube, the reading of the meter approximates the dynamic transconductance of the tube closely enough for all practical purposes.

(Continued in Next Issue)



FOR THE TECHNICIAN—

Universal
Replacement
Power
Transformers



Without Insulating Cover

With Insulating Cover

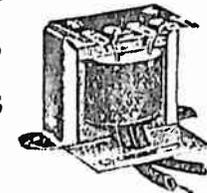
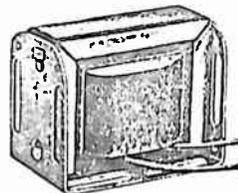
UNIVERSAL REPLACEMENT INPUT and OUTPUT TRANSFORMERS, FILTER CHOKES

The slotted bracket arrangement allows for compact mounting in almost any position

SEMI-ENCLOSED AUDIO AND FILTER UNITS.

**FILAMENT TRANSFORMERS
OUTPUT TRANSFORMERS
FILTER and AUDIO CHOKES
CLASS A**

**INPUT TRANSFORMERS
CLASS A OUTPUTS**



UTC transformers may be installed in more than 90% of standard A. C. radio receivers manufactured in the past seven years.

These units are conservatively rated and should stand up over a long period in all climates.

Plate and filament voltages are clearly marked opposite the conveniently located lugs on each transformer.

LINEAR Standard Line

For the Broadcast Station, Studio and Sound Engineer.

P. A. - LINE

For the Public Address Man.

THE HYPERM ALLOY LINE

High Fidelity Audio Components for Portable Pre-Amplifier and Remote Pickup Applications.

**RADIO SUPPLY COMPANY
PACIFIC RADIO EXCHANGE.**

ASK FOR CATALOGS

**UNITED
TRANSFORMER CORP.**



"WHAT PRICE NEWS?"

(Continued from page 5)

They do not even present a large majority of the news truthfully and in an unbiased manner.

News service bureaus have been forced to refuse service to this station. KNX has built up a vast and efficient news gathering organization to collect the important news of the entire world and bring it to its listeners not hours, but minutes, after it happens, and in some cases even while it is happening.

The attitude of these papers is characteristic of the old "die-hards" in all branches of endeavor. These selfish minds who would retard progress and civilization for the sake of a few dishonest dollars are a serious obstacle to the advance of civilization. It is not necessary to point out the many cases in history of this attitude by old timers to the advance of newer and better things. If radio broadcasting is a better way to distribute news—and we know beyond a doubt that it is—then let us develop it to its highest degree of efficiency and usefulness.

These newspapers have, as a gesture of childish spite, refused to print the broadcast schedules of KNX. Every technician and dealer should keep familiar with the programs of this station so that he may advise his customers of the daily features. We of the radio industry, the most rapidly advancing industry of all time, must unite in a concerted effort to overcome the retarding influence of so-called big business and monopolies.

**UNITED TRANSFORMER
HAS NEW LINE**

According to Mr. C. E. Strassner, local representative of the United Transformer Corporation, the company has a new line of high fidelity transformers of unusual design. These units are contained in a very small case with terminal lugs solidly anchored on the top of the case. The very small size and light weight of these units making them extremely valuable as components in portable equipment is made possible by the use of Hiperm Alloy cases.

The company also has a complete line of standard replacement transformers for all types of repair and service work. Specification sheets describing the entire line may be procured from your jobber.

**PAT MARINACK TAKES
THE FATAL STEP**

Mr. Pat Marinack, of Radio Specialties Co., well-known and well-liked throughout the radio industry in Southern California, was married Saturday afternoon, May 12, at two o'clock.

Mrs. Marinack, who was formerly Miss Jesse Mae Foster, of Los Angeles, was finally won after approximately three years of ardent wooing on Pat's part.

After the ceremony, at which Mr. Dooley, the high-pressure partner of Mr. Marinack, was best man, the couple left for a short honeymoon at Catalina Island.

We know that we speak for the entire membership of the Certified Radio Technicians Association when we offer congratulations and extend the sincerest wishes for a happy and blissful married life "Until Death Do Them Part."

NEW AUTO VIBRATOR

A boon to auto radio service technicians and dealers is the new vibrator unit developed by Mission Bell engineers.

This unit possesses several outstanding features. Perhaps the most important is the fact that the entire unit may be removed from the shield can and handled and adjusted while in use. Also it is not necessary to completely dismantle the whole set to reach the location of the unit. Adjustments are made by means of an adjustment screw.

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.

Quality Electric Co.

Incorporated

812 S. San Pedro Los Angeles

QUESTIONS AND ANSWERS

Conducted by CHARLES MILLER
Chairman, Technical Board

Q. The Trimmers on a JB 62 do not seem to align the set properly. They are mounted on the top of the coils instead of on the gang. How can I make this set sharp? —R. P.

A. The "Trimmers" you mention are coupling condensers between plate and grid of the following tube. The usual setting is about 1½ turns out from maximum. If they are in too far the set will oscillate on maximum volume control settings. If the gang needs trimming bend plates.

Q. A Peerless receiver has a bad hum that appears to be coming from the detector....It is not the tube nor inductive pickup by the transformer....How can I correct it?

A. Try a RC filter in the B+ to the first AF transformer. A 100,000 ohm resistor and a ¼ mfd condenser should do.

BUSINESS IS GOOD

The California Radio Laboratories reports that business is steadily increasing and the future looks brighter than ever before. Some of this optimism, caused by increased business, is undoubtedly due to the fact that during the past twelve months less than one tenth of one per cent of all the jobs turned out by this company have been returned as defective. This is indeed an enviable record.

**RADIO EXCHANGE ENGINEERS
DESIGN TRANSMITTER**

The transmitter engineers of the Pacific Radio Exchange have just completed a fifty watt power line transmitter for the Bureau of Power and Light of Los Angeles. This equipment, designed and built by this firm, will be used for communication between Los Angeles and Boulder Dam. This system which uses the power lines as carrier circuits for the radio frequency signals is somewhat similar to wired radio and is quite an interesting method of radio communication. The Southern California Edison Company and other companies have inaugurated similar systems with very satisfactory results. Mr. Frank LeBell, manager of the Radio Exchange, has promised that his engineers will have a complete technical article describing the features of this equipment ready for publication in the "Technician" very soon.

**Leo J. Meyberg
Company, Inc.**

335 West Washington

Los Angeles

Exclusive

Distributors of

R. C. A. Victor

Public Address

and

Sound Reinforcing

Systems

Mention The "Technician" when answering advertisements—It identifies you.

Mention The "Technician" when answering advertisements—It identifies you.

Multi-Tap Power Supply Unit

(Continued from page 5)

as Figure 1. Especial attention is called to condensers "C₁" which are shunted directly across each half of the high secondary winding. Their purpose is to lower the peaks occurring in this circuit. Oil condensers with a working voltage of 3500 are required. All other condensers and resistors are of conventional design. A relay labeled REL is included in the pack controlling the "B" unit from the radio set. The relay coil is in series with the "A" supply to the set so that when the switch on the set is "turned on" current flows through this coil, closing the relay contacts and thereby turning on the pack. In this way there is no necessity for molesting the wiring in the set or going into the set at all when installing the power unit.

Since the variation in current drain differs but slightly for a wide range of sets (for a given plate voltage) the 135 and 180 volt taps are gotten by series resistors rather than a voltage divider—thus saving extra load on the contacts. Variations of ± 15 per cent in the total load current on the set will cause voltage variations of only ± 10 volts on the 180 volt tap. Corresponding variations will occur on the 135 volt circuit. The 90 volt tap intended for screen voltage only, has a separate bleeder and consequently will be little effected by load variations. Fig. 2 shows regulation curves on the 250 volt tap.

With the exception of the vibrator portion the power circuit is identical to any normal AC operated radio receiver. Turning on the switch on the radio set allows current to flow through the tube filaments. But this current must first go through the relay (REL) in the pack clos-

ing the relay contacts and turning on the "B" power unit. Current flows through the Coil "L₄" in the vibrator unit drawing the reed over, making contact with one arm. This action accomplishes two things—firstly, it allows current to flow in one half of the primary setting up a high voltage in the secondary winding, and secondly, shorts out the coil allowing the reed to spring back through its own tension. In springing back it connects with the opposite contact arm sending current through the second half of the primary but in an opposite direction. Consequently a reserve current is set up in the high voltage winding.

The reed has by this time lost its spring power, and, since leaving the first contact, the coil is exerting magnetic effort the reed is pulled back to the first contact to repeat the cycle. The voltage induced in the secondary, a form of A. C., is rectified by the 84 and filtered in the usual manner.

The input has no positive or negative, so that it makes no difference which side of the car battery is grounded—the output polarity is always correct.

All parts are firmly anchored to the chassis, nor should this feature be passed over lightly. The continuous vibration and jarring will tear loose anything which is not tied down to stay down.

While the inland service men are modernizing motor radios, alert service men situated in sea ports, large inland lakes and summer resorts should keep a strict weather eye out for the very fertile field of motor cruisers. Most of the larger boats have radios whose equipment is badly in need of modern "B" power units working from the self starter or ignition battery. Summer time is play time, but not for the energetic service man who wants to write his own ticket of summer profits.

• Chief Engineer GENERAL TRANS. CO.

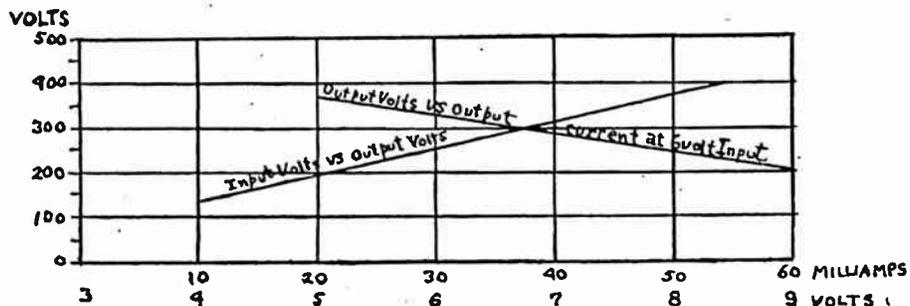


Figure 2

NEW RAYTHEON DISTRIBUTOR

The firm of Radio "Doc" is pleased to announce that it is distributor for the Raytheon 4 pillar tubes and carries the complete line at very attractive discounts.

Also, new characteristic tube sheets are ready and available for distribution for all who may wish them, as well as window display material.

The 4 pillar construction has been well advertised, and the buying radio public is quick to react to the Raytheon tube, as its construction is rugged, distinctive and efficient.

NEW DEVICES

The Electric Products Service Co. reports the development of a popular priced attenuator to be used with the new Miller Oscillator described in the March issue of the "Technician."

Another new product of this company is a noise test device for tubes which may be used in conjunction with standard tube testers.

Meter Repairs ALL MAKES Test Equipment Modernization

THERMO COUPLES
SHUNTS - MULTIPLIERS

Westinghouse Instrument
Service

Beede Meters
Speaker Rewinding

Official
DAYRAD and SUPREME
Factory Service

Electric Products
Service

1358 S. Grand PR. 3681

What Chance Do You Take in Using Good Power Transformer Rewinds?

Our records show that in the past twelve months our customers have returned to us as defective only one-tenth of one percent of all the jobs we have put out.

We believe that this is a record and we challenge any manufacturer to beat it.

Such a record is the result of good conscientious workmanship and the use of the best materials available. In other words your chances are a thousand to one that both you and your customers will be entirely satisfied.

Why not take the gamble out of your power transformer jobs by using GOOD REWINDS?

Why work your head off trying to make a so-called replacement transformer fit the job when our service is available?

"There is no substitute for a Good Rewind"

All Work
Guaranteed
Twelve Months

Free
Installation

California Radio Laboratories

2523 South Hill Street
PRospect 3515

RADIO INTERFERENCE BUREAU

MR. W. F. GRIMES, Chief Engineer
Radio Interference Engineering Bureau

The daily work of the Radio Interference Engineering Bureau brings to light many conditions of poor radio reception which may be classified as general and which could be prevented by a proper understanding of the situation. During the past month a number of unsatisfactory receiving conditions have been brought to the Bureau's attention wherein the difficulty was indicated by an A. C. hum modulation of the carrier. This modulation being present only when the receiver was tuned on the carrier, the receiver being apparently in good condition when off station. A condition such as this is usually an indication of defective house wiring or fixtures. A simple test for a condition of this type is to tune the receiver to a carrier so that the undesired modulation is heard. With someone listening to the receiver the entrance switch and fuses for the house in question should be inspected. Each fuse should be tested to make certain that it is tight. In the event tightening of the fuses does not relieve the modulation condition then each circuit represented by the branch fuses should be separately dropped by unscrewing the fuses of each circuit. This will necessitate moving the receiver at least once to some other circuit in the house.

When the circuit is dropped, which discontinues the undesired modulation, a thorough inspection should be made of all connections in the wiring of this circuit including fixtures. It will be found that modulation has been caused by an

arc in the A. C. circuit due to a loose connection or to a partial ground of the hot leg of the circuit to conduit or some other grounded object. Repairs to the house wiring and fixtures should be made by someone authorized to do so. In making tests of this type it is well to unscrew each fuse to determine if the fuse is in good condition. Many cases have been found where fuses have blown and pennies have been placed under the fuse thereby shorting out the protection for the house wiring which is required by law and regulation. One condition was discovered during the past month in which the entrance switch had become so hot that it was impossible to open it with the bare hand. In this particular case it was discovered that a ground had developed in the conduit between the entrance switch and the watt-hour meter. This ground had resulted in the blowing of the main fuses. Pennies had been substituted; consequently there was no protection between the ground and the utility's service line.

Obviously this condition would have resulted in a serious fire had it not been discovered as it was.

Wherever pennies are discovered in fuse blocks the tenant should be given to understand that such a practice is unlawful and is a decided fire hazard. Only recently, in a nearby town, a house burned completely down from just such a cause as this. After the fire the local electrical inspector found a fuse block partly molten but with pennies behind the fuses; his report resulted in the can-

(Continued on page 18)

SKAGGS TRANSFORMER COMPANY

5894 S. Broadway, L. A. FREE DELIVERY ADams 7652
LARGE STOCK REWOUND TRANSFORMERS
FOR IMMEDIATE EXCHANGE

— New Low Prices —

FILTER BLOCKS REBUILT NEW SPEAKER FIELDS
Transmitting Chokes, Modulation, Power and Coupling Transformers
over \$15.00 on time payment plan of \$5.00 per month,
no carrying charge or interest.

AN EASILY BUILT SLIDE-WIRE BRIDGE

By A. PAUL, JR., Technical Service Laboratories

This article deals with the construction of a slide wire bridge from parts to be found around any radio service shop. The accuracy of this bridge is much higher than it is possible to achieve with any ohmmeter, or like instrument.

The subject will be covered in four parts:

- I. A brief explanation of the theory of a bridge.
- II. The construction of the bridge proper.
- III. Construction of the 1000 cycle microphone hummer.
- IV. Detailed instructions for using.

Brief Explanation of the Theory of a Bridge

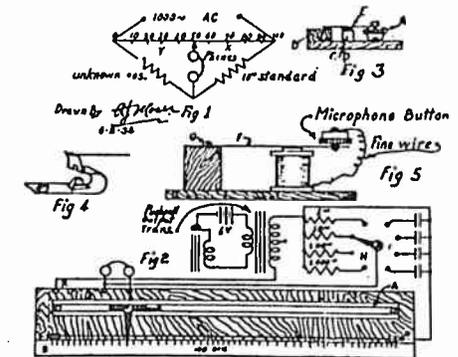
Resistances and capacities are measured on a bridge by what is known as the "comparison" method, that is, by comparing them with resistance and capacity units of known value. For example in Figure 1, if the unknown resistance is 10 ohms and the standard is 10 ohms, the bridge is balanced when the slider is at the exact electrical center of the slide wire, or in other words the ratio of distance x to distance y would be 1 to 1, a balanced condition being indicated by a minimum of sound in the head phones. Now if the unknown resistance was 100 ohms and the standard 10 ohms, the slider would be so set for minimum sound in the phones that the ratio between distance x and y is the ratio of the unknown resistance or capacity to the known or standard resistance or capacity. The reason for 1000 cycle AC being used instead of 60 cycle is that it is much easier to find the null point on the slide wire when using the higher frequency.

Construction of the Bridge

Secure a piece of 1 by 6 lumber, preferably hard wood, 44 inches long and mount thereon a piece of metal moulding (A) Fig. 2 and 3, as formerly used in house wiring. Below this fasten a piece of $1\frac{1}{2}$ by $\frac{3}{4}$ wood 44 inches long, Fig. 2 and 3. (B) Now rule this into 100 equal divisions one centimeter apart, starting $2\frac{1}{3}$ inches from one end, each tenth division should be ruled slightly heavier. The wood should first be painted white or the marking can be done on a piece of white paper which should be glued to the wood.

C and D, Fig. 2 are two Fahnestock binding posts from an old "B" battery and are bent as shown in Fig. 4. Between these two a piece of resistance wire from

a wire wound volume control should be stretched and soldered. Care must be taken not to allow solder to run over the wire which is the active slide wire as a change in resistance of this section would upset the accuracy of the bridge. The



Fahnestock clips should be so adjusted that their upper edges coincide with the first and last mark of the scale. They should also be adjusted to maintain considerable tension on the wire and thus hold it taut.

The slider arrangement (E) is simply a piece of $\frac{1}{4}$ inch hard rubber panel filed down so as to slide easily back and forth in the metal moulding. Onto this is mounted a pointer which makes contact with the slide wire and also extends over the ruled scale and acts as an indicator. A low contact resistance rotary switch (H) should now be made and fastened on the base board.

To the contacts will be connected the various resistors and condensers used as standards.

I have found upon checking the Ohm-mite "Red Devil" resistors on a Leeds and Northrup Wheatstone Bridge, that 50 per cent of them are accurate to within $1/10$ of 1 per cent, therefore I suggest that you order about 4 of each value that you will need from your jobber, with the understanding that you will be able to return those not used. Then check them all on a standard bridge (there are several CRTA members who have one) and retain the ones which are nearest their marked rating. The values you will need are 1, 10, 100, 1000, 10,000 and 100,000 ohms. The same method can be used for condensers and the values

(Continued on page 19)

Mention The "Technician" when answering advertisements—It identifies you.

Radio Interference Bureau

(Continued from page 16)

cellation of the insurance policy. In this case the insurance amounted to \$2500.00. In other words, the owner of that particular building sacrificed \$2500 for the price of two fuses.

(This article is the first of a series of accounts of the interesting cases discovered by this bureau in the course of its regular work. Mr. Grimes, who is well-known to most of the readers of this magazine, has very kindly offered to conduct a monthly feature column which will undoubtedly be of great interest to engineers and technicians. He requests the cooperation of all persons in bringing radio interference to the attention of his engineers. However, before reporting disturbances take reasonable steps to ascertain that the noise or interference is not the fault of the radio receiver itself or its accessories. Questions sent to Mr. Grimes, in care of The "Technician," will be answered in subsequent issues.—Editor).

RADIO-TELEVISION COMPANY CLOSING OUT AMATEUR STOCK

The Radio-Television Supply Company, 1000 South Broadway, has announced a definite and revolutionary change of sales policy effective at once. This company has closed out its entire stock of transmitting and amateur supplies and parts. In the future only the patronage of dealers and service dealers and technicians will be solicited, and only men coming within the above classification will be extended trade discounts according to Mr. Alex Hirsch, owner and manager of the Radio-Television Supply Co. The beginning has been made by this and other progressive firms and it is to be hoped that others will follow in a concerted campaign to eliminate the practice of extending trade discounts promiscuously.

KIERULFF & GODDARD TAKE NEW LINE

The firm of Kierulff & Goddard have recently taken distributorship of the Packard-Bell line of home and automobile radio receivers. This popular line of locally built sets (notice the golden poppy sticker on the chassis) has continually advanced in popularity during the past few months until at the present time it is enjoying a considerable volume of business. These sets are designed and tested by the well-known R. G. Leitner, formerly Chief Engineer for Jackson-Bell.

OPEN FORUM

May 9, 1934

Mr. Norman B. Neely
1569 Munson Avenue

Dear Editor:

The attitude of a spectator of your editorial called "Cut-Rate Business," is simply one of the old school of economists of whom, I am sorry to say, we have plenty.

I am the mother of three progressives, of modern youth, who, I am glad and delighted to say, see things in the plain open way of epose, that will end the depression. The situation of sorrow and suffering caused by the said merger and monopolistic control will never be forgotten by this youth, and the results it has caused will be reflected in our young people for many years to come both in their morale, and lost education, and physically, the lack of proper nourishment to up-build strong, husky bodies, will stare us all in the face for the rest of our generation. The effect of the progress on the race of such a deplorable state of affairs as now exists will be felt during the next century in results.

It is never too late to rectify mistakes. Closeup circulation of capital, that of trading with those at home who prove themselves unallied with Monopoly, will immediately commence an up-building trend. This program lies only in the hands of the buyer. A good price for an article always provides a cause for a good wage to be paid, and a good wage provides greater buying power, which in turn creates a means to purchase: which purchase causes a greater demand for production, and more men are hired to meet the demand.

It is up to us, Women of the Nation, the 85 per cent of the BUYING POWER of the country, to pull ourselves out of the mess and mire of this National Catastrophe, by refusing to buy the bargains flaunted in our faces by the chiseling, cut-rate competition of the swindling weasel, Wall Street and those copy-cats educated in its methods, its small enterprises, knowing perfectly well that a poor price paid for an article makes a lesser wage to our husbands, and no job at all, when the firm for which he works goes broke, through a purchasing price too low to sustain the overhead of the plant. Let us educate ourselves to pay well for all we buy, and prosperity will be with us again.

Yours sincerely,

KATHERINE A. WEBB JAMES,
Chairman Board of Directors
Consumer's & Producer's League.

An Easily Built Slide-Wire Bridge

(Continued from page 17)

you will need are .0001, .001, .01, .1 and 1. microfarads.

The standard resistors and condensers should be mounted around the rotary switch and all wiring connected as shown in Fig. 2.

Construction of the Microphone Hummer

A microphone hummer is simply a buzzer which has a transmitter or microphone button in place of the usual contacts.

The relay used on the old Philco "A" and "B" eliminator furnishes an ideal electromagnet for the hummer; however, if none is at hand one can easily be constructed by winding 50 to 100 turns of No. 20 D. S. C. wire around a soft iron core. The armature F (Fig. 5) is a piece of core iron from an old audio transformer which should be slotted at one end so that by loosening screw (G) Fig. 5 and shifting the armature, the frequency of the note can be varied.

The remainder of the details are self evident by examining Fig. 5 (note that the transmitter button is mounted on the armature only, and very fine wire is used to complete circuit, a heavy wire would dampen the vibration of the armature).

The hummer should now be mounted on sponge rubber or felt and secured to the base board of the bridge. A sound proof case should be placed over the hummer as the high pitched note it emits is very penetrating and interferes with finding the "null" point when balancing the bridge.

The hummer should now be connected in series with the secondary (4 ohm) winding of a push pull output transformer and 4 to 6 volts D. C. Now, when a pair

of head phones are connected across the other winding of the transformer an ear splitting 1000 cycle (approximate) tone should be heard.

Use of Slide Wire Bridge

Connect the unknown resistor or condenser across terminals xx, start the hummer and move the slider back and forth till a point is found where the sound is least. If this comes close to the one end of the slide wire, set the standard selector switch to the next higher value standard, if it comes near the other end of the slide wire, set the switch to the next lower value standard, the idea being to have the null point come as near as possible to the center of the slide wire (for greatest accuracy).

Having found the null point, the unknown resistor is to the standard resistor, as the distance from the pointer to one end, is to the distance from the pointer to the other end.

NEW AUTO SET HAS ATTRACTIVE FEATURES

Troy Radio Manufacturing Company, announces a new super auto radio with the latest features, such as a quick detachable mounting plate and extension speaker jack. Rigid tests on this new Troy "HyWay" Model 56 have exceeded all expectations for selectivity, sensitivity and tone quality. The actual time for installing a "HyWay" set has been clocked at 30 minutes, which makes considerable time saved on this operation.

Also, the new Troy All Wave "World Cruiser," Super Five is reaching the far corners of the universe and is proving itself to be able to satisfy the distance getter who wants foreign stations.

The Following Lines in Stock—

Carter Volume Controls
Eveready Batteries
Advance Tubes
Advance Speakers
Advance Condensers

Triad Tubes
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PR. 0490

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Los Angeles

We Welcome You With Prices That Are Right.

MANUFACTURERS ASS'N. OF SO. CALIF. BENEFITS THE LOCAL INDUSTRY

The Radio Manufacturers Association of Southern California is an organization duly incorporated under the statutes of the State of California composed of local manufacturers of quality radio receiving sets and allied equipment. These members all deserve a great deal of credit for their successful effort to help rout the chiselers and dishonest members of the radio manufacturing industry.

Technicians, dealers and engineers are urged to aid their fellow citizens by supporting these local manufacturers who show not only a sincere desire but the ability to work toward the same goal that the Certified Radio Technicians Association is striving to reach. Namely, a condition whereby it will be possible for legitimate, competent, honest and de-

serving men in the radio field to earn a respectable living and be justly proud of their chosen profession. These firms employ a large amount of local labor. To help them will help relieve the severe unemployment conditions which have been so distressing to the radio industry in the past.

This Association as a whole, has signified its desire to cooperate with us by stopping, to a very large extent, indiscriminate price-cutting on the list price of worthwhile radio merchandise. This is at least a significant step forward when two radio associations are willing and capable of cooperating to the extent of aiding one another for a common cause.

When buying locally manufactured radio sets be sure to look for the golden poppy sticker on the chassis which designates the manufacturer as being a member of the Radio Manufacturers' Association of Southern California.

Quality Dependability - Service -

PUT THE TUBE END OF YOUR BUSINESS
ON A STABLE AND PROFITABLE BASIS.

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THOMAS B. PRITCHARD, Calif. Sales Agent
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1348 West 20th Street
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For Sale—

444 Jewel Analyzer, perfect condition.
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Television outfit complete \$75.00. KHJ
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Dunn, 6082 Selma Avenue, Hollywood.
GLadstone 3044.

Triplet and Weston Meters. Complete
stock. Radio "Doc."

No reasonable offer refused for the follow-
ing: Rider's Manuel No. 1; Readrite
Test Kit No. 700; Perfect Scanning
Disks for KHJ. H. I. O'Brien, A-1
Radio Co., Glendale Calif., 1379 East
Colorado Blvd., Phone DOuglas 1638.

For Sale or Trade—

Will swap 10 new 4 gang General Instru-
ment Co. Variable condensers, 7 x 7
foot auto tent, 1 folding double camp
bed (all metal) and G. E. 50 cycle
phonograph motor. Want meters,
machinery, test equipment, binoculars,
vice or what have you? A. Paul, Jr.,
Technical Service Labs. ORegon 2233.

10 acre ranch (clear) inside city limits
small town 15 miles north of Visalia.
Has 10-room house, oranges, berries,
chicken equipment, electric pump, etc.
Will trade for Hollywood home, income
property or sell for cash. N. B.
Neely, ALbany 1628.

3 acre chicken ranch or small farm with
6-room house (clear) inside city limits
small town 15 miles north of Visalia.
Will trade for Beach Cottage, labora-
tory and P. A. equipment, or sell for
cash. N. B. Neely, ALbany 1628.

Wanted—

Edison pick-up, or attachment with dia-
mond point, for Brunswick panatrope
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PERSONALS

C. B. Miller and W. O. Watts, better known to their many friends as Wally and Gerry are now located at the Radio Supply Co., at 912 S. Broadway. Both were formerly with the Radio-Television Supply Co.

Harry Gavin Hoyt, formerly associated with the service department of Walkers, Inc., has deserted the radio business and taken up writing for a living. He is the author of the well-known Charlie Wong stories in the magazine section of the Sunday Times.

Jimmy Thompson, another old timer formerly associated with Walkers, is now with the California Piano Supply Company according to last reports obtained on his whereabouts. Jimmy has the habit of moving quite often.

Cliff Buterworth, former assistant engineer with the Jackson-Bell Company (in the good days), has deserted radio for the time being and is busy manufacturing aluminum recording discs for the various motion picture studios.

Charlie Nichols, formerly with Jackson-

Bell and Mission Bell, is now associated with the service department of the Beacon Electric Company. He still hates auto radios.

Bob Skiels, formerly with the H. R. Curtis Co., is now associated with the Northrop Corp. at Mines Field. Bob is making planes now instead of radios.

LOCAL FIRMS OFFER PRIZES

The prize contest announced elsewhere in this issue and which is expected to arouse considerable interest among readers of The "TECHNICIAN," is made possible by the cooperation of four of the leading wholesale concerns in Los Angeles. Prizes are being awarded by the Radio Specialties Company, 1816 W. 8th St., Radio "Doc," of 721 S. Main St., Mr. Bill Hitt, local representative of the General Transformer Corp., and Thomas B. Pritchard, California Sales Agent for the Arcturus Radio Tube Company.

The prizes offered by these men will be well worth contending for and every reader is urged to enter a manuscript and compete in this contest.

SERVICE DEALERS

Microphone and Interstage Coupling Transformers

No. 0075. Single button to grid of tube. Dealers Net Price, \$1.44.

No. 0058. Double button to grid with center tap for P. P. Dealers Net Price, \$1.92

Shielded 1000 Series High Quality Transformers.

No. 1089. Two-Button microphone to single or push-pull grids. Dealers Net Price, \$5.88

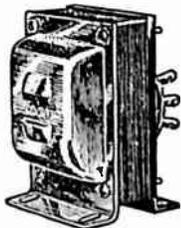
No. 1152. Tube to line, four independent windings, 200, 200, 5000 and 5000, to be used in series or parallel, Dealers Net Price, \$5.88

No. 1310. Microphone-to-line, microphone-to-mixer or line-to-line. 1 to 1 ratio center tapped windings, for any 200 to 600 ohm circuit. Dealers Net Price, \$5.88.

Universal Microphones, Transformers and Allied Items have been used over a period of six years by those who want constant quality transmission of sound. Sold by Dealers and Jobbers everywhere.

Universal Microphone Co., Ltd.

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THE LOWEST PRICES—

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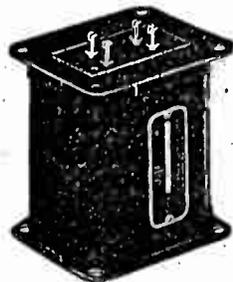
OLD WORDS? MAYBE, BUT IT MEANS WHAT IT SAYS HERE!



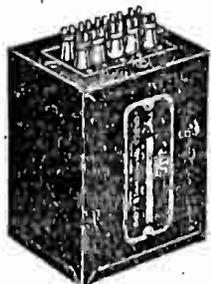
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1. THE PUBLIC ADDRESS SERIES of audio, filter and power components are designed to satisfy the demand for a popular priced quality line with universal features and impedances. All cases are finished in a black eggshell enamel to suit exacting commercial requirements as to appearance.



2. HIGH FIDELITY HIPERM ALLOY audio components for portable pre-amplifier and remote pickup applications. Small and compact but designed for high quality broadcast reception.



3. UTC LINEAR STANDARD AUDIO UNITS represent the closest approach to the ideal transformer from the standpoint of uniform response, low wave form distortion, high efficiency, thorough shielding and dependability. Each unit is housed in a high permeability cast iron shield, for mounting on rack or chassis with lugs either at top or bottom

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TRANSFORMER CORP.**



The "TECHNICIAN"

Official Publication of the Certified Radio Technicians' Association
An Organization of Competent, Qualified and Trustworthy Radio Technicians for the Purpose of Advancing the Radio Art and for the Protection of the Public.

A. PAUL, Jr., President

JOHN L. VINCENT, Vice-President

JOHN A. ORME
Secretary-Treasurer



Editor - Manager
NORMAN B. NEELY
1569 Munson Avenue
Los Angeles, California

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VOL. I

JUNE, 1934

No. 10

EDITORIAL

By The Editor

"Why You Should Join The CRTA"

The radio industry as a whole is a peculiar one with peculiar problems. The rapidity of advancement is truly astounding. Our design engineers, all specializing in their chosen fields, are continually developing newer and better circuits and tubes.

The service profession as applied to modern radio has its own very perplexing problems. Due to the tremendous number of different types of receivers and allied equipment which have been put into the hands of users during the past ten years the scope and range of a service technician's knowledge and experience must be almost limitless in order to cope with the ordinary day's assortment of work and repair jobs. As a result of this fact and the unprecedented advancement of the art, the old "screwdriver" technician and neighborhood tinkerer has been almost entirely eliminated. Much has been done to raise the status of the efficient radio technician and service dealer.

What are the requirements of an efficient, modern radio service technician? He must have an extensive fundamental knowledge of electricity and radio. He must have some means of keeping continually in step with the rapid progress of the industry. Inasmuch as radio becomes more complicated in theory and practice day by day he must have some means of extending his general engineering knowledge. He must have connections to assist him repulse the underhanded attacks of unscrupulous and unqualified

competition. He must have extensive equipment and the wherewith-all to maintain it in step with the constant improvement and changes in standard and custom built equipment.

The next question is how is one to provide himself with all these things? An enterprising, energetic man with an education considerably above the average and experience can, at substantial expense, manage to maintain himself and provide these requisites individually.

The majority of us, however, lack one or more of these points of advantage even if we did desire to be a lone wolf. Competition is keen, money is scarce—how may we, the majority, manage to survive in such a maelstrom as the radio service profession of today proves itself to be? "In unity there is strength." By combining our assets and energies we may gain for ourselves these advantages.

The officers and members of the Certified Radio Technicians Association have worked valiantly and striven, not in vain, to build an organization of, by and for honest, deserving, competent and far-seeing radio technicians for the benefit of the entire radio industry and the radio public.

As a group we have been able to publicize our aims and purposes. In issuing certificates of proficiency yearly by examination, we have been able to give the public protection in identifying a competent man. This in turn protects the

(Continued on Next Page)

TUBE TESTING FROM THE SERVICE VIEWPOINT

BY J. L. MAHON, Sylvania Tube Distributor.

A paper presented before the L. A. Section of the Institute of Radio Engineers Mar. 26.

PART THREE

A novel way of obtaining transconductance on a uniformly divided scale, and at the same time eliminating the reading of the D. C. component, is arrived at by use of the dynamometer movement. In this circuit one of the coils of the dynamometer is excited with a constant A. C. current 180 degrees out of phase with the A. C. grid voltage, and the other coil carries the plate current of the tube. The deflections of the meter are then directly proportional to the A. C. component of the plate current. The D. C. component in the plate circuit does not affect the reading because there is no fixed polarized field for it to react with. To complement the last test, some manufacturers provide a D. C. milliammeter for the D. C. component. A satisfactory test for gas content based on grid current, is provided by introducing a large resistance, usually one-half megohm, in the grid circuit. The change in grid voltage arising from grid current in this resistor is reduced to zero by a small potentiometer. This potentiometer changes the grid voltage by small increments. The amount of change in grid voltage required to offset the change due to gas current, is taken as an arbitrary value for ionization and serves the purpose very well.

The most important of the internal leakage conditions found in service is that between cathode and heater. The most practical method so far developed for testing that condition is to observe the plate current of the tube under regular operating conditions. When the cathode is disconnected, any leakage through to heater and ground will tend to close the plate circuit and a small increment of plate current will be observed.

Tube testers operating with D. C. potentials on the tubes may be connected to any audio amplifier and reproducer through an interstage transformer or by impedance coupling. This serves the purpose of testing for conditions that come under the general classification of noise.

Rectifier testing presents no serious problems, the diode emission being observed when a proper A. C. potential is supplied to the anode and cathode. The error should not be made of testing rec-

tifiers with a D. C. anode potential, because the ionization current of gas would be added to the thermionic emission, causing an erroneous reading that would not indicate the rectifying ability of the tube.

A recent development in commercial equipment available for tube testing that seems to be making a favorable impression on the public and members of the servicing fraternity—who are quick to react to anything with public appeal—is the introduction of so-called "English reading" testers. Irrespective of the basic circuit the instruments are compensated in various ways so that the meter will indicate a definite value for a good tube, regardless of type. The meter scale usually has a sector marked "Good," "Fair," "Reject," etc. While there are no theoretical reasons why an instrument could not be built to perform in such a manner, it is found in actual practice that instruments of that type have not reached the necessary precision. The limits of acceptance are usually found to vary on different types of tubes in such a manner as to make one standard impractical.

In my opinion, it would be better to use equipment reading directly in the characteristics as we know them. The public, of course, should be educated to expect the technician to use and interpret the readings so obtained. This would necessitate cooperative action on the part of the industry as a whole, but the results in improved service through standardization would more than offset the trouble required. Under a system of that type, a manufacturer of equipment using vacuum tubes would determine in his laboratory at what low value of standard characteristics of the tubes the operation of the equipment would be so impaired as to make tube replacements desirable. This information would be available with other service instructions.

Among the things of importance to be considered in connection with testing tubes and future developments is the fact that there has been a tendency to increase the impedance of amplifier tubes and associated circuits. The plate resistance may take the place of the transconductance as an important characteristic. Recent developments in the use of

(Continued on page 19)

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PATTERSON ENGINEER ADDRESSES CRTA

Mr. Ray Gudie, chief engineer of the Patterson Radio Co., addressed the Certified Radio Technicians Association at a recent meeting. Mr. Gudie described the technical features of the all-wave models and how best to install and maintain them. He also spent considerable time giving the members detailed information on the peculiarities of certain older models with suggestions to simplify service on them.

NEW FIELD FOR AUTO RADIO SETS

Something different in the way of auto radio installations was brought to light with the installation of a Philco receiver in an ice delivery truck owned by Mr. Ray Skeels of South Pasadena. Mr. Skeels, a distributor in the Highland Park district for the Frozen Steam Ice Co., had this installation made the first of June (by a Certified Radio Technician, of course) and reports not only that does it relieve some of the hardships of his daily toil but has attracted considerable interest from customers, prospective customers and other delivery men. His chief difficulty seems to be avoiding the receipt of "hot" music when he has a load of ice.

WHAT IS A SALE?

At a recent meeting of the CRTA the speaker challenged any member of the audience to define a sale. Promptly, our usually quiet Charlie Nichols arose in the back of the hall and said, "These days a sale is a transaction in which two persons endeavor to 'out-chisel' one another." We are afraid Charlie is correct.

Technicians !!!

INCA TRANSFORMERS are original equipment in the great majority of all receivers built on the Pacific Coast. Why use rewinds or expensive universal transformers when a duplicate of the original unit is available at very low cost? INCA TRANSFORMERS may be had at all the better jobbers.

INCA'S new 24-page catalog, containing circuit diagrams, design chart and performance curves, in addition to complete data on INCA'S new line of transformers will be at your jobber on or about June 20th. Get one there, or write to—

Inca Manufacturing Division

of Phelps Dodge Copper Products Corp.

Los Angeles Branch

2375 East 27th Street Los Angeles, Calif.



QUALITY IN PUBLIC ADDRESS

By I. A. MITCHELL

Chief Engineer United Transformer Corp.

The tendency towards reduction in quality of reproduction in P. A. and broadcast amplifiers during the past few years has brought about a strong reaction on the part of purchasers and users of this equipment. Many amplifier manufacturers and constructors have been under the impression that quantity production and low prices are the only way to get business. The error of this assumption is gradually becoming apparent, and many amplifier constructors who take pride in the performance of their equipment realize that low prices are a safe policy only when quality does not suffer.

The word "quality" in audio amplifiers can be covered by four major points insofar as the ear is concerned. These are low frequency discrimination, low harmonic distortion, ample power-handling ability, and low hum level. The first of these qualities is controlled almost entirely by the transformers used in the amplifier. Good transformers are available; one grade on the market today having a response from 30 to 15,000 cycles. The second factor, harmonic distortion, is inherent in the amplifier construction, and also in the transformers used. Proper bias should be maintained on all the tubes, and transformers with negligible saturation are required. Transformers used in class B circuits are particularly critical, and matched units of a reliable manufacturer are the best bet towards good reproduction.

Power handling ability is inherent in the circuit and tubes used. Many wild and exaggerated claims are being made today regarding the output of amplifiers on the market, but few of the manufacturers of these amplifiers can state that harmonic content is non-objectionable at these inflated power outputs. The best method of judging power handling ability is from the data published by responsible tube companies.

Objectionable hum can be attributed to four distinct sources. These are plate supply hum, filament supply hum, electrostatic pickup, and electro-magnetic pickup.

Plate supply hum can be readily corrected through the use of adequate filtering. It is important in this respect to use dependably rated filter chokes. There are many highly over-rated reactors available on the market today, which lose as

much as 80 per cent of their inductance when appreciable D C is passed through them. Filament supply hum has been reduced to a negligible value through improvements in tube structure, heater type filaments, and correctly center tapped filament windings. Electrostatic pickup can be neglected if all high potential A. C. leads are kept short, and far from input equipment. It is also essential that the power transformer coil be electrostatically shielded. Magnetic pickup is the most common form of hum. It is essential that audio components and wiring are placed as far as possible from the power supply, even making the amplifier in two units, when necessary. An aluminum chassis will also eliminate a very large portion of the stray flux normally carried by the chassis. The input transformer is the most likely source of hum pickup and should be rotated to the point where minimum output hum is obtained before being permanently fastened.

Broadcast transmitters and phonograph recordings have been improved from year to year to a present very high standard of quality. Why not manufacture "quality first" equipment, which can really take advantage of this high quality level?

EXCEPTIONAL LECTURE ON SALESMANSHIP

At the June 6th meeting of the CRTA a very worthwhile talk was given by Mr. Carroll Page Fisk, following the regular technical hour. Mr. Fisk is well-known to executives and large concerns in and around Los Angeles and has been employed to conduct classes in modern methods of selling for such firms as the Evening Herald and the May Company and has been conducting classes at the University of Southern California.

Mr. Fisk's manner of approach to the subject was dynamic and left no doubt as to his wholehearted effort to teach the art of making a sale. The usual dull and dry talk on selling was changed into a drama in which the salesman becomes the hero actor, while the buyer takes the roll of the villain who hides behind his excuses, bluster and closed doors. How to conquer the villain, battle down the excuses and win the desired good will of said buyer is all in the cards which Mr. Fisk holds.

Mr. Fisk held the attention of the gathered assembly of 150 without a single "walkout" for an hour. A number of progressive technicians are contemplating enrollment in a five weeks course offered by this gentleman.

INCA ISSUES NEW CATALOG

The Inca Manufacturing Division of the Phelps Dodge Copper Products Corporation, will have a new catalog ready for distribution to the trade in the very near future. This catalog will contain specifications and prices of a complete line of transformers and chokes for every purpose.

MR. ALEX HIRSCH TO CONTINUE SPONSORSHIP

Mr. Alex Hirsch of the Radio-Television Supply Co., who has been sponsoring Mr. Leitner's lectures for the past three months has very kindly offered to continue the sponsorship for a further period. The members of the Certified Radio Technicians Association are indebted to Mr. Hirsch for many favors during the development of our organization.

GUEST CARD

The meetings of Certified Radio Technicians Association are closed meetings and admission is only gained by presentation of a membership card showing the bearer to be a member in good standing. In order to give the readers of The "TECHNICIAN" an opportunity to see just what one of these weekly meetings is like the coupon below, when filled out and presented to the doorman, will admit the bearer as a guest. These meetings are held every Monday evening in the auditorium on the third floor of the National Radio and Electrical School, at the corner of Santa Barbara and Figueroa.

Mr. Leitner begins his lecture at 8:00 P. M. At 9:00 the meetings are convened for business or for the presentation of other speakers.

Please admit
Mr.
Whose
Address is.....
Telephone Number.....

This invitation as a guest is authorized by the Board of Directors of the Certified Radio Technicians Association.

(To be valid this form must be filled in).

*May we extend
our thanks to the
members of the
CRTA for their
patronage.*

We are convinced that those members with whom we have had the pleasure of doing business are certain as we are that

**"There is no substitute
for a
Good Rewind"**

All work guaranteed one year

POWER TRANSFORMERS
REWOUND
SPEAKER FIELD COILS
SPECIAL AUDIO
TRANSFORMERS
FILTER BLOCKS

**California
Radio
Laboratories**

2523 South Hill Street
PProspect 3515

A CALL TO ARMS

By A. PAUL, JR.
President CRTA

The Radio service industry, your industry if you please, is fighting a battle to the death against those monsters in human form, those despicable vultures, those carrion-fed ghouls, who are destroying the confidence of the public in our profession. This situation is especially tragic at this time, as it affects not alone our means of earning a livelihood, but due to the vast amount of unemployment among our fellow citizens, radio entertainment is their only succor from worry over their pitiable plight; and yet, every day, many of these unfortunates are deprived of their last chance of relief from the monotony of their dreary existence by these swindlers.

What are you doing to help rid an honorable profession of these parasites?

As a good American citizen, it is your duty to vote. If you don't go to the polls and voice your opinions on major issues, you are in the same category as those creatures, who, either through indifference to their country's fate, or sheer cowardice, fail to respond to the call to the colors when their homeland is invaded. The term "slacker" is a mild name for individuals of this type.

If you are a legitimate and capable Radio Technician or Service Man, it is your duty to your fellows to join with them and fight for the survival of this noble profession, which does so much to bring sunshine into a world overcast with gloom. You should feel just as obligated to vote and fight for major issues which affect the welfare of your profession as those which affect the destinies of your country.

Therefore, I implore you, don't be a "slacker," don't let the rest of us fight for you, while you lap up the gravy. Heed the clarion call to arms, join the legion of the CERTIFIED RADIO TECHNICIANS, and help us vanquish this unwholesome foe, whose foul stench nauseates even the angels on high.

STOLEN SET

Philco 60B table model, serial No. T68566. Stolen from Lancaster Radio & Music Co., Lancaster, Calif. Any information regarding this set will be appreciated by the Lancaster Radio & Music Co., and may be communicated directly to them or to the editorial offices of The "Technician."

THRIFTY LOOSES BLUE EAGLE

Los Angeles, June 6—According to a news item in the Los Angeles morning Times, the National Recovery Administration ordered the Thrifty Drug Stores in California to surrender its Blue Eagle for violation of the trade practice provision of the retail drug code.

The case has been referred to the compliance division of the NRA with a request that suit be filed to obtain an injunction against the company to restrain further violation of the code.

The assertion made against the stores was that they had violated the code by selling certain articles at retail prices below the manufacturers list price per dozen.

PIONEER IN LOCAL RADIO SUCCUMBS TO HEART ATTACK

On May 18, 1934, Mr. A. E. Ravenscroft, of A. E. Ravenscroft, Inc., was the victim of a fatal heart attack. This gentleman, friend to an untold following in the radio industry, was a member of the pioneer firm of Kierulff and Ravenscroft who were distributors of Crosley radio for many years. This firm was the original builder of the radio station which is now KHJ and the old station KNRC which is now KTM.

Mr. Ravenscroft was the first chief of the Radio Pioneers of Southern California. A short time ago, at the dissolution of the firm of Kierulff and Ravenscroft, he started the new concern which bears his name. This business, so splendidly begun, will be carried on by his daughter, Mrs. Allene Ravenscroft Magner.

The industry has indeed lost one of its most dependable and well-liked members who has done so much in the development of the art and the maintenance of honest business.

JOBBER EXTENDS SERVICE

The Radio Products Sales Co. has recently established a separate department specializing in public address systems and all types of amplifiers with Frank Hernfeld in charge. Mr. Hernfeld is well-known in Southern California for his engineering ability and offers to consult with all technicians on matters concerning their daily problems. Ebert Matteson and C. E. McCoy, CRTA members, are also members of the technical staff and invite other members to give them an opportunity to be of service.

QUESTIONS AND ANSWERS Conducted by CHARLES MILLER Chairman, Technical Board

Q. Can a different type of IF coil be substituted for the parallel wound type that has only the secondary tuned? I have had several short out.

A. Such breakdowns due to surges or excessive B voltages can be eliminated by using an IF having two 3/16" windings coupled 1/16" apart. Tune the secondary only, as before.

Q. Can an 84 be substituted for a 6Y5?

A. Yes, if the socket is changed to a five prong.

Q. What is the cause of the blue shadow on the glass of some 47 tubes?

—A. A. S.

A. This glow is due to fluorescence caused by stray electrons from the filament striking the thin film of getter on the inside of the bulb. This fluorescence is a natural phenomenon and has no relation whatever to the performance or condition of the tube.

LECTURE COURSE VERY VALUABLE

The weekly lecture course in advanced servicing and practical engineering conducted by Mr. Richard G. Leitner, for the exclusive benefit of Certified Radio Technicians and Associate members, becoming more and more valuable as progresses. Mr. Leitner, who needs no introduction or description of qualifications to the radio trade, has spared no effort in preparing his lectures in such a manner as to give a maximum amount of real, usable and important information in each week's one hour lecture.

All members are urged to be sure not to miss a single one of these lectures as they follow a definite sequence. All non-members interested in keeping up to date and advancing their knowledge in step with the trend of development in modern radio are invited to join the association and take advantage of this, an many other privileges.

Radio Products Sales Offers A Few Specials to Readers of The "Technician."

- 1 mfd. 1000v Condenser \$1.29
- 2 mfd. 1000v Condenser \$1.98
- 4 mfd. 1000v Condenser \$2.98

These are Can Condensers and are full voltage and capacity. Something new in L. A. Guaranteed 100 per cent.

* * * * *

"B" BATTERIES, 45-v—New Stock

SPECIAL OFFER—65c EACH; 59c in lots of 6

* * * * *

STRANDED PUSH-BACK WIRE—Red, Black and Green 40 CENTS PER 100 FOOT ROLL

* * * * *

WE CARRY A REPLACEMENT TRANSFORMER FOR ANY RADIO—GET OUR PRICES BEFORE YOU BUY.

* * * * *

FULL LINE OF CARTER REPLACEMENT VOLUME CONTROLS.

* * * * *

Radio Products Sales Co.

PR. 0490 1314 South Hill Street Los Angeles
We Welcome You With Prices That Are Right.

MICROPHONES



Handi-Mike

HANDI-MIKE. Single and double button. "On" and "Off" switch in handle. Dealer's net cash: single, \$5.88, Double, \$8.82.

MODEL X and XX. Single and double button. Stretched and protected diaphragm. Pioneer among low-priced mikes. Dealer's net cash: single, \$4.41; double, \$5.88.

MODEL A. Single button. Highest developed microphone of this type. 200 Ohms—100 to 3500 cy. Dealer's net cash, \$8.82.



Model "KK"

MODEL BB. Two button. General all-purpose microphone. 200 ohms—50 to 5000 cy. Dealer's net cash, \$14.70.

MODEL KK. Two button. Three degrees of sensitivity. 200 ohms—40 to 6000 cy. Dealer's net cash, \$23.52.



"E" Condenser

MODEL LL. Two button. Three degrees of sensitivity. Extra rugged and dependable. 200 ohms—30 to 7000 cy. Dealer's net cash, \$35.28.

MODEL E. Condenser. Two-stage amplifier. 35 to 10000 cy. Non-microphonic tubes drain 1/4 amp. at 6v and 4 mils on 180v battery. Dealer's net cash, \$35.28.

Universal's new catalog sheet has just come off the press. It contains complete details of microphone list, including lapel mikes and single and double button watch models, 3-channel mixers, stands, input stages, microphone tone control, transformers, microphone input—a hundred items of interest to those in radio. Get a copy from your jobber, or write on your letterhead direct to—

Universal Microphone Co., Ltd.

INGLEWOOD

CALIFORNIA

Mention The "Technician" when answering advertisements—It identifies you.

NOTICE TO CRTA MEMBERS AND THE TRADE:

Official notice is hereby given that the notices sent out recently by one Louis Natini stating that the Radio Trades Protective League would hold a meeting under the auspices of the Certified Radio Technicians Association, were not authorized or sanctioned by the Certified Radio Technicians' Association or any of its officers. This Association has no connection with Mr. Natini or the Radio Trades Protective League. Mr. Natini was allowed a short time to explain a plan which he supposed would eliminate certain unfavorable conditions in the radio industry.

Below is a copy of a letter to Mr. Natini from the office of the Secretary, which will clarify the situation:

May 25th, 1934

Mr. Louis Natini
Radio Service Dept.
Pan American Trading Co.,
3465 West 6th Street
Los Angeles, Calif.

Dear Sir:

I have at hand several letters signed by you which have been turned over to me by members of this Association. I hereby demand to know by what authority you or the "Radio Trades Protective League," or any other body, have to state that you are holding a meeting under the auspices of the Certified Radio Technicians Association. You were merely granted permission to speak for, not to exceed fifteen minutes at our meeting. As if this were not a serious enough breach of etiquette, you had the audacity to solicit funds.

Only members of our Association have the privilege of bringing guests. I therefore demand that you spare yourself and the guests you so graciously invited, the embarrassment of having them turned away at the door, by cancelling the notices you have sent out.

Respectfully yours,
(Signed) JOHN A. ORME,
Secretary.

ARCTURUS USES NEW SEALED CARTON

The Arcturus Radio Tube Company, Newark, N. J., announces that its tubes are now being shipped in the new sealed-type of carton. Besides being a protection for the purchaser, this carton has a greater degree of eye-appeal and enhances the appearance of the dealers' shelves.

UNUSUALLY INTERESTING SERVICE MEETING

An unusually interesting and instructive program was offered at the service meeting held on the RCA Victor recording stage at 1016 N. Sycamore Avenue Friday evening, June 1. This meeting was even better than the previous ones arranged for technicians by the Leo Meyberg Co.

Dick Westphal gave a brief but comprehensive technical description of the new RCA Victor automobile receiver. He also pointed out the many mechanical features which will make installation and service easier for the technician. Next on the program was Mr. Larry Lang who described the new RCA Victor all wave antenna system recently placed on the market after months of extensive research and development by RCA Victor engineers.

After a very amusing Mickey Mouse reel the feature speaker of the evening was introduced. With a view to making these meetings more interesting and appealing to the trade the Meyberg Co. has made a definite effort to secure speakers of unusual interest without any trace of advertising.

At this meeting the guests were privileged to hear Mr. Paul Johnson, transmission engineer with the Southern California Telephone Co. Mr. Johnson delivered an exceptionally interesting paper which described the problems involved in long distance transmission of audio signals over wired circuits and how these difficulties have been overcome by the Telephone Co. This paper, profusely illustrated by means of slides and supplemented by demonstrations on actual equipment set up by Mr. Johnson, was of extreme interest and value to service technicians.

The Meyberg Co. is indeed to be congratulated upon its foresight and ability in obtaining such an outstanding speaker to address the guests at this meeting. We wish them success in providing more speakers of this calibre for the benefit of the trade in general.

WEDDING BELLS!

Mr. Roy K. Tate, well-known Certified Radio Technician, operating his own sales and service business in Inglewood recently embarked upon the sacred sea of matrimony. The marriage took place several weeks ago but only became public knowledge recently. Congratulations Mr. Tate!