

THERE'S NOTHING NEW ABOUT
Consignment Selling

As Far As **TUNG-SOL** Is Concerned

AN ACCOUNT OF STEWARDSHIP
 A RECORD OF SERVICE

Two years ago Tung-Sol perfected the policy of merchandising radio tubes on a consignment basis.

Today, more than 9,000 TUNG-SOL retailers and wholesalers will agree that they are just about two years ahead of competition in consignment experience—and that this experience is a valuable asset to them in promoting profits.

To build a successful retail organization the size of TUNG-SOL'S, the sales plan must be right. To maintain retail prices, protect margins, insure full stocks of all items, and at the same time avoid high retailer investment and obsolescence is no small achievement. Yet these objectives have been attained and maintained by TUNG-SOL CONSIGNMENT-SELLING PLAN over a period when they were particularly needed.

TUNG-SOL is happy to throw this spotlight on a successful record of cooperative service to its wholesalers and retailers and to commend them on their foresight for having chosen the TUNG-SOL sales plan as their road to profits.

The difference between the TUNG-SOL Plan and others lies in the fact that TUNG-SOL CONSIGNMENT-SELLING has been tried and proved over a period of two years and found definitely profitable. In the perfected TUNG-SOL Consignment Plan, the wholesaler is protected by an exclusive territorial franchise which eliminates any chance of abuses, profitless competition and any tendency on the part of retailers to resort to price cutting. Isn't such a plan worth investigating — N O W !

PHONE, WRITE OF WIRE—Your Territory May Be Open!

DISTRIBUTORS, INC.

1816 S. Flower Street

PRospect 8920

Los Angeles, Calif.

« The »
"TECHNICIAN"

May Issue



NEW PRIZE CONTEST — SEE PAGE 7

Standard Parts

AND

Radio Accessories

Exclusively for Dealers and Service Dealers

Radio-Television Supply Company

1000 South Broadway

:-:

TRinity 8716

BUILD ---



YOU as Dealers and Technicians, and we, as Jobbers, each have a definite responsibility. Neither of us can afford to support agencies that deliberately attempt to tear down honest price structures.



RADIO SPECIALTIES COMPANY
1816 West 8th Street
Los Angeles ♦ ♦ ♦ FEderal 6633

— INDEX —

"What Price News"?.....Page 5
By Norman B. Neely

Multi-Tap "B" Power Supply.....Page 6
By G. McL. Cole

Prize ContestPage 7

Tube Testing From the Service
ViewpointPage 8
By J. L. Mahon

Technical Questions
and AnswersPage 11

Radio Interference Bureau.....Page 16
By W. F. Grimes

Easily Built Slide-Wire Bridge.....Page 17
By A. Paul, Jr.

Open ForumPage 18

PersonalsPage 22

Classified Advertising.....Page 21

PRIZE CONTEST

Be sure to read the announcement on page 7 for the details of a new prize contest offering many valuable prizes.

METERS

Electric and Radio Service Co.

All Service Guaranteed

Phone Richmond 5873

1111 West 11th Street

Los Angeles --:-- Calif.

We specialize in METERS and TEST EQUIPMENT

METERS REPAIRED — TEST EQUIPMENT BROUGHT UP-TO-DATE.

We Carry At All Times

Most Complete and Biggest Assortment of

RADIO PARTS

— In The West —

All The Nationally Known Makes of

REPLACEMENT PARTS

TEST EQUIPMENT

PUBLIC ADDRESS SYSTEMS

RECEIVERS AND TRANSMITTERS

WHOLESALE TO DEALERS AND SERVICEMEN ONLY

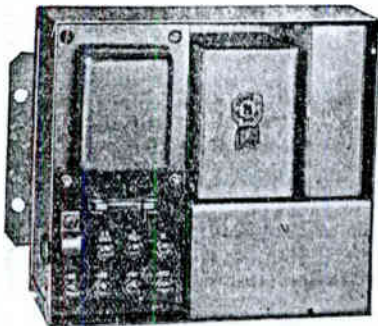
Radio Supply Co.

912 So. Broadway Los Angeles, Calif.

Phones VAndike 3178 - 3179 3170

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

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
1569 Munson Avenue
Los Angeles, California

\$1.50 Per Year

15 Cents Per Copy

VOL. I

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

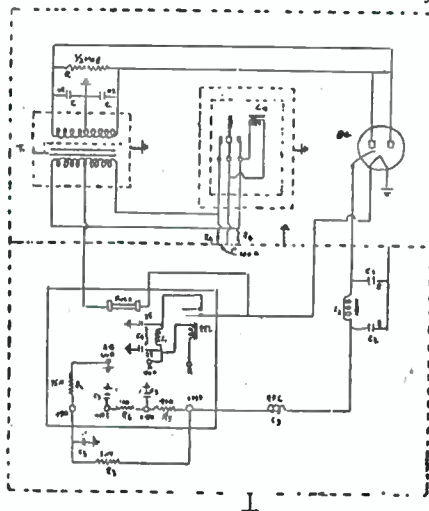


Figure 1

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. Grimes
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.

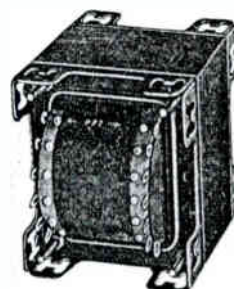
Regulation in the circuit is kept at a minimum by using tapped primaries on the power transformer for adjusting line variations. Since the steady plate current in the plate circuit does not enter into the final result, but rather the change, the initial reading is eliminated in one of two ways: (1) by 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

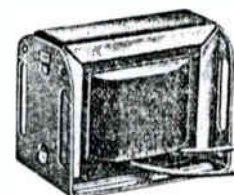


Without Insulating Cover

With Insulating Cover

UNIVERSAL REPLACEMENT INPUT and OUTPUT TRANSFORMERS, FILTER CHOKES

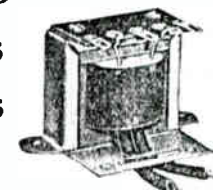
The slotted bracket arrangement allows for compact mounting in almost any position



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

P. A. - LINE

For the Broadcast Station, Studio and
Sound Engineer.

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.

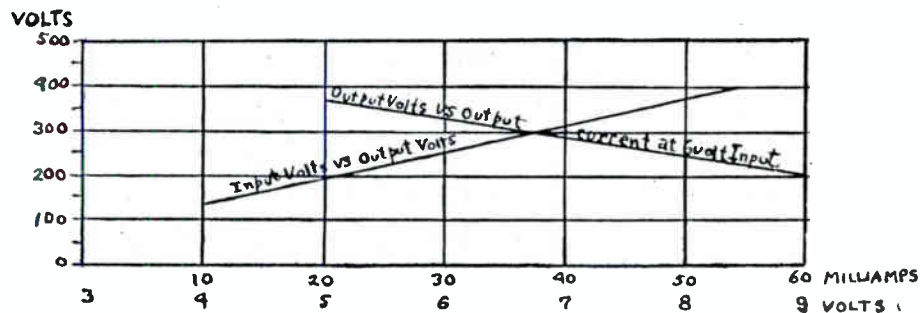


Figure 2

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.

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

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

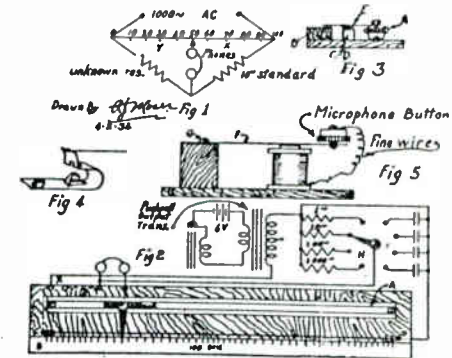
Resistances and capacities are measured on a bridge by what is known as the "comparison" method, that is, by comparing them with resistance and capacity units of known value. For example in Figure 1, if the unknown resistance is 10 ohms and the standard is 10 ohms, the bridge is balanced when the slider 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 Ohmmite "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)

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 CLOSSES 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 unalied 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
ClaroStat Vol. Controls
Metal Prod. Transformers
Miller Coils
Naald Adapters

Radio Products Sales Co.

PR. 0490

1314 South Hill Street

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.

ARCTURUS RADIO TUBES

THOMAS B. PRITCHARD, Calif. Sales Agent

1214 Venice Blvd.

PRospect 9810

Los Angeles

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

Classified Advertisements

1348 West 20th Street
Phone ATLantic 9501

For Sale—

444 Jewel Analyzer, perfect condition.
\$37.50. Logan, OREGON 2681. 5276
West Adams St.

Television outfit complete \$75.00. KHJ
scanner in beautiful cabinet—6 tube
specially made receiver—speaker. Lynn
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 Manual No. 1; Readrite
Test Kit No. 700; Perfect Scanning
Discs 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
to play old Edison records. Will pay
cash. John S. Christilaw, 2217 Hono-
lulu Ave., Montrose, Calif.

Good auto radio in exchange for printing.
Ralph S. Hawks, 222 So. Avenue 57,
Los Angeles.



RCA Licensed

"The Radio of Tomorrow"

"Western Made for
Western Reception."

Midgets

Consoles

Auto Radios

D. C. Radios

Air Cell Radios

Short Wave Radios

1934 MODELS HERE

EVERYTHING IN RADIO

Radio Parts

Accessories

Radio Tubes

Cabinets

Wire

Amplifiers

Microphones

Speakers

Meters

National Lines

Free Diagrams

Bulletins—Circulars—Advice

We Solicit Your Patronage

Wholesale Distributors

RADIO "DOC"

W. L. "Bill" Sexton

VAndike 3104 - 3105

721 S. Main St. Los Angeles

Free Parking Next Door

PERSONALS

G. 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

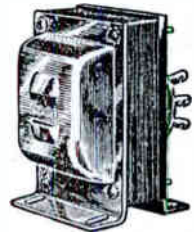
No. 1152. Tube to line, four independent windings, 200, 200, 5000 and 5000, to be used in series or parallel, Dealers Net Price, \$5.88

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.

Inglewood - - - - - California



**Mister
Radio Man - -**

WHETHER YOU BUY A RIVET

Or a

STORE FULL OF PARTS—

We want Your Business

and we are prepared to give you everything
in the way of—

LARGE STOCK SELECTION—

QUALITY MERCHANDISE—

THE LOWEST PRICES—

and

A GENUINE SERVICE—

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



Phones: TRinity 2926 - 2927 - 2928

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