Slide Resistors

When exact resistance required is unknown but must be arrived at by experimental adjustment... and even changed occasionally... use Aerovox Slide Resistors. With additional contact bands these Slide Resistors become ideal bleeder resistance networks for power pack applications.

Fixed resistors can provide no more permanent adjustment than these Aerovox Slide Resistors, once set and locked to desired value. For these adjustable resistors are simply Pyrohm vitreous enamel units, with bared track for band contact. Note these features:

- Quality wire... Crack-proof refractory tubing... precisely wound.
- Wire ends brazed to lugs... handy soldering tab terminals... horizontal mounting brackets.
- Supplied in 10, 30, 50, 75, 100 and 200 watt ratings. 1 to 100,000 ohms. Extra sliders at small additional cost. Fit companions indeed for handy Pyrohm Jr. fixed resistors, as well as for the complete line of Aerovox condensers.

FREE DATA: New 1935 Catalog featuring the complete Aerovox line of condensers and resistors sent on request. Also sample copy of monthly Research Worker. Meanwhile see line at your local supply house.

AEROVOX CORPORATION

PACIFIC COAST REPRESENTATIVES
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1. Higher Quality.
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EDITORIAL
By The Editor

Radio Servicing--A Profession

There has been much discussion both among the various members of the trade and editorially to the effect that the radio service man is a professional and deserves the prestige, consideration, dignity and position in the modern business world accorded other professionals.

Undoubtedly that is true—but what are we doing about it? The average service technician is inclined to bemoan his fate in being forced to compete with chiselers and unscrupulous screw-driver technicians but continues to overlook the fine points of customer contact.

Let us all stop for a moment and take stock of ourselves and see just how deserving we are of being placed in the professional category. Do we conduct our business in an efficient, business-like manner, or do we accept business management as a necessary evil, consisting only of having our name in the phone book, paying the rent and trying to keep our test equipment not more than five years out of date? What is our attitude toward the customer? It is granted that there is much foundation for the service technician to have a mental picture when the word “customer” is mentioned of some grotesque monster with sharp horns and a long red tail or possibly a three-headed dragon with saw teeth along its back.

First of all, we must correct our own personal psychology and mental attitude to better fit ourselves to strip these monsters of their horns, tails and spiny backbones and cause them to appear more like well-meaning, conscientious, honest human beings.

We must all admit that there is plenty of reason for the average radio owner to be suspicious of all radio technicians as a result of having been “gypped” time and time again by free service call rack-

(Continued on page 19)
ADJUSTING RECORDER HEADS
By JAMES L. FOUCH
Test Tech., Universal Microphone Co.

With recording making its bid for the spotlight in radio, it seems a fit time to forward technical information regarding the adjustment of recording pick-ups and recording cutters. Increases in the output power of the ordinary radio amplifier has made it possible to easily convert them into good recording outfits for the experimenter or the man looking for semi-professional results. High fidelity amplifiers have improved the quality of professional recordings not because of any extended range but for the reason that their response curve is more flat. In this article it is hoped that recording heads of interest to the two classes of recording enthusiasts above mentioned will be covered so that they will be enabled to adjust their recording cutters to their own particular requirements.

The average home recording phonograph pickup is a combination instrument being used for both recording and playback. In such an instrument the resistance must be exceptionally low and the inductance high in comparison, thus giving greater power transfer than some ordinary phonograph pick-ups may be adjusted for recording, with this idea in mind the radio service man may experiment and install apparatus where meddler quality is found satisfactory.

Most magnetic pick-ups are of the same general design, having a coil, armature, and a magnet with two pole pieces. The greatest variation in the type lies in the method of damping. The pivot of the armature is damped with rubber between two pole pieces. The rubber damping prevents lateral vibration at the bearing and reduces, but little, the rotary or pivotal function of the armature at this point. For use as a recorder the pivot should be damped still greater. This being accomplished by loosening the screws and clamping the pick-up in a vice very tightly with two .020 inch shims placed in the gaps between the poles and the tip of the armature. The damping pressure should be increased at this point if the pick-up is to be used as a recorder. It must be kept in mind that the armature should be adjusted to the center of the gap between the poles, for the best tone quality. In the event that the paddle is damped by projecting it through a slit in a rubber block, the damping may be increased by inserting a brass shim under the bridge holding the rubber block. This applies the pressure downward, limiting the movement at the pivot bearing as well as at the top of the armature.

After the foregoing, the question comes up—why dampen the pick-up when we want something sensitive? It must be remembered that you are translating electric power into mechanical power and that it must be held within a definite range of movement. Another reason for the damping is that it smooths out the frequency characteristics and gives a good quality recording on the various materials as recommended for semi-professional work. Among these are listed the Universal Processed Aluminum discs and various soft composition blank records. Many recording men have obtained very good results with combination recording heads on these materials and prove that better than average results may be obtained upon aluminum discs by a little patient experimenting.

For those who are more professionally inclined and wanting real quality recordings for transcriptions, etc., etc., an especially constructed cutting head should be purchased. These recording heads are tested and adjusted at the factory, but in the event that they become unadjusted it will be of some value to acquaint oneself with the adjustment of such apparatus. The new Universal Power Recording Head is a magnetic type, requiring no extra field supply. It is a small compact precision instrument of \( \frac{3}{4} \times \frac{1}{2} \times \frac{3}{8} \) inches in dimensions. (Continued on page 24)
METHODS OF CALCULATING THE CURRENT CARRYING CAPACITY OF RESISTORS


It is often required to find the maximum safe current for a resistor of given resistance and power rating, such as a voltage divider. This problem can of course be readily solved with well known equations, yet it seems to take more time and trouble than is warranted, probably because of the extraction of a square root; particularly when fractions are involved. In this article the solution by algebraical methods will be reviewed, showing how one can avoid the fractions; a labor-saving chart is also presented, which shows the answer at a glance for practically all such questions and with an accuracy which is sufficient for all practical purposes.

Calculation of Maximum Current or Voltage

The power in a circuit is found by any one of the three well known equations:

\[ P = \frac{E}{R} \quad (1) \]
\[ P = V I \quad (2) \]
\[ P = E^2 R \quad (3) \]

depending on which are the given quantities. Here, E is expressed in volts, I in amperes, R in ohms and P in watts. When the power is the required quantity, these equations are to be used, but if the voltage or current is required, the equations have to be transposed so as to bring either E or I alone to the left of the equation. This gives:

\[ I = \sqrt{\frac{P}{R}} \quad \text{amperes} \quad (4) \]

\[ E = \sqrt{P R} \quad \text{volts} \quad (5) \]

Before going over to the examples, it is necessary to discuss the voltage divider briefly. Such a divider might for instance be rated at 50 watts, allowing a certain maximum current. Now the resistor is divided into sections carrying different amounts of current and consequently dividing the power unequally over the resistor. It should not be thought that since one section is carrying less than its share, that other sections can handle more so as to bring the total up to 50 watts again. That cannot be done; the maximum current is to determine by supposing that the entire 50 watts is to be divided uniformly and the current found in this way should not be exceeded in any section.

Similarly, the maximum voltage across the resistor may be found by equation (5) again assuming that no current is to be drawn from any tap. If any part of the resistor is to carry less than the allowable maximum current, the maximum allowable voltage is more than the value found by equation (5).

Mathematical Methods of Calculation

Example 1: What is the maximum allowable current for a resistor of 15000 ohms and 25 watts?

Using equation (4) and substituting values:

\[ I = \sqrt{\frac{25 \times 1,000,000}{15,000}} = \sqrt{\frac{50}{3}} = 6.25 \text{ watts} \]

Example 2: What is the maximum allowable voltage across a 75000 ohm resistor with a power rating of 10 watts?

Use equation (5); substituting values:

\[ E = \sqrt{10 \times 75000} = 100 \sqrt{75} = 866 \text{ volts} \]

Example 3: A speaker field has a resistor of 10000 ohms and is rated at 6 watts. What is the current required?

Use again equation (4a)

\[ I = \sqrt{\frac{6 \times 1,000,000}{1000}} = 60 \text{ amperes} \]

\[ E = \sqrt{60 	imes 10,000} = 600 \text{ volts} \]

Example 4: A resistor of 10,000 ohms is to carry a current of 25 ma., what is the dissipated power? Use equation (2) remembering that I is in amperes:

\[ P = \frac{0.025 \times 10,000}{0.000625 \times 10,000} = 6.25 \text{ watts} \]

If the squaring of a fraction is inconvenient, the equation can be written:

\[ P = \frac{I^2 R}{1,000,000} \quad \text{Watts} \quad (2a) \]

where I is in milliamperes. Using the same example:

\[ P = \frac{25 \times 10,000}{1,000,000} = 0.025 \times 10,000 = 250 \times 10,000 \]

\[ = 1,000,000 \times 6.25 \text{ watts} \]

The table in this article has been prepared for users of standard size resistors. It shows the maximum allowable current for the most common resistors of this page.
CATHODE RAY TUBES AND OSCILLOGRAPHS
NOTES ON THEIR DESIGN, CONSTRUCTION AND OPERATION

By J. L. MAHON, E. E.

With the recent advent of Cathode ray tubes to the service field many techni-
cians are becoming interested in the ac-
quision of an oscillograph either by pur-
chase or construction. One of the
chief concerns is the life of the tube
as early tubes had a short life due to gas
ions destroying the cathode surface.
Tubes developed and marketed during
the last few years are of the high vacuum
type and their life is comparable to the
life of well-baked television picture tubes.
Contrary to common belief, the failure of
the tubes is due to the loss of filament
emission and not to screen fatigue; opera-
tion at the proper heater voltage will
therefore insure a long life for the tube.
The oscillograph besides being a very
useful service instrument is also justified
from an educational viewpoint as it al-
 lows the observer to visualize conditions
of voltage, phase, etc., which at were a strain on the imagination.

There are several good oscillographs
on the market at a reasonable price, of
which the Dumont type 145 is a good ex-
ample. For the men who wish to
build their own instruments either to save
money or for the experience or both, the
following general notes have been pre-
pared. The electrical circuits of the os-
cillographs can be divided into two sec-
tions, first, the power supply and con-
trols for focusing the beam and secondly
the power supply and circuits of the
sweep oscillators for moving the spot
horizontally while observing the signal.

In this issue we will deal only with the
power supply and controls for focusing,
taking up sweep circuits, etc., in the next
issue along with actual circuits and con-
struction details.

Since the beam of electrons and the
spot is deflected by either magnetic or
electrostatic fields, the cathode-
tube should be well shielded to prevent
"worms"; this is a form of distortion
produced by static fields such as small ripples etc. in the pattern. Trouble
of this nature is usually harder to elimi-
 nate in the compact portable instru-
ment because of the proximity of the
power transformer. For laboratory in-
 stallations it is recommended that the
power supplies and sweep circuits be
placed at least three feet from the tube
and voltages supplied through a well
shielded cable. The anode and deflect-
ing plates are 1000 volts positive in respect
to the heater cathode and intensity grid;
signals being applied between the anode
and plates make it necessary to ground
the anode. This places the heater cathode
and grid 1000 volts negative with respect
to ground and requires good insulation
on that part of the circuit.
The DC voltage supply to the tube
may be any well filtered 1000 volt set-up.
The voltage is not critical and may be
actually anywhere between 900 and 1100.
Improper filtration will show up in the
form of intensity modulation, the same ap-
p earing as a ripple. Without the sweep the signal appears as dark waves moving across the
pattern, very annoying. A by pass of
1/2 mfd. across the intensity potentio-
 meter is helpful in reducing this effect.
High resistance leakage between the grid,
cathode, heater winding or focusing grid
and any part carrying AC will cause this
trouble in a similar fashion to ripple in the
power supply. The heater winding
for the cathode tube should be electro-
statically shielded from all other windings
and well insulated to prevent leakage.

(To be continued)

BAY CITIES RADIO
TECHNICIANS ASS'N.

At the recent meetings of the Bay
Cities Radio Technicians Association we
have had such speakers as Charlie Nich-
ols, formerly an engineer with Jackson-
Bell, Mission Bell and now with Packard-
Bell; Joseph Tami, Jr., instructor at the
Frank Wiggins Trade School, who gave us
a very instructive talk on systematic ser-
vice methods; Joe Reiside, technical and
service sales representative for the Gen-
eral Electric Co., whogaveus some inter-
esting side lights on the trip through the
Southwest, during which he visited many
radio men and groups of radio men.

We plan to have regular classes in
radio servicing in the very near future
and also further information to be brought
out in discussions. We hope to have an
attendance of approximately fifty within
two months.

THE FIGHT IS ON

United States Senator Arthur Capper
(Kansas), in a recent speech said, "The
independent business men whose numbers have been reduced from 1,600,000 to
something over a million in the last
decade, is not getting a square deal
under present conditions. He is being
destroyed by the ruthless business meth-
ods of the huge Chain Store combina-
tions through their predatory business
methods."

We know that this statement is one of
fact. The Chains are getting stronger
and the Independent has only the prospect
of bankruptcy facing him in the not too
far distant future. This is not a pleas-
ant prospect and the law of self-preserva-
tion demands that we fight back with all
the skill and resource at our command.
To effectually wage a winning fight the
CRTA has joined together with other
trade associations and formed the Inde-
pendent Retailers Tax Protective League.

We have found in the past that we can-
not rely on the promises of vacillating
legis labors, so we are going directly to
the people of California. An initiative
petition embodying a real chain store tax
law with teeth in it, is being circulated,
and will be put on the ballot for a vote
of all the people at the next general
election. No amendments of the Legislau-
ture in the Senate, not a veto of the
Governor can effect its purpose. It be-
comes a law, if passed, that cannot be
tampered with.

You will be asked in the near future
to help in this work. It is of vital impor-
tance that we all work together; the com-
bined efforts of all trade associations and
their members, coordinated under the
banner of I. R. T. P. League cannot but
bring success. We suggest and recom-
mand that you support this movement
with your money, time and effort. Sub-
scribe to the "Pacific Argus," the I. R.
T. P. League official weekly organ; be
come an associate member and if possi-
dible donate to the best of your ability, and
get your friends to do likewise.

Soon representatives will call on you.
Give them your courteous cooperation
and with combined and coordinated ef-
fort we will sweep on to Victory and re-
claim for the independent the right to
live decently, without fear of the morrow
—An American creed dearly cherished
by all of us. Call your officers or I. R.
T. P. League headquarters, MTual 2479,
for any further information.

TROY ALL WAVE POPULAR

The new Troy Model 84U high fidelity
radio receiver is proving quite popular
with Southern California listeners. It
is housed in a burl walnut inlaid cabinet
and uses an airplane, double ratio
vener dial. It covers a band wave of
15-550, employing an eight-tube super-
heterodyne circuit and a wide range
audio system.
RADIO TECHNICIANS OF SAN DIEGO EXPOSITION NUMBER

By DURAN W. SEIBERT

Whistles blew, bells rang, horns tooted, cannons roared and merry-makers joined in fun and forgot their daily routine when President Roosevelt, over direct telephone from his White House study, gave the opening address and dedicated two orphans to throw the switch to officially open the California International Exposition at eight o'clock p.m., May 29th, illuminating the beautiful Exposition grounds at San Diego with vellies of lighting effects of all colors and descriptions.

The Midway, with its leather-throated barkers offering their wares, "Life","Crime", Ripley Believe It or Not", "Miss America", "Boulder Dam" and countless others. Rides, thrills, spills, exhibits extraordinary throughout the 12 miles of Exposition grounds.

Not only does the Exposition offer such glamorous exhibits and fun making, but many points of interest to the Radio Technician. May we comment on a few: Something a little different from the many points of interest to the Radio Technician. May we comment on a few: Something a little different from the

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The music loving technicians, if we have such a thing, will be interested in the Hammond Console organ, just recently put on the market and made by the skilled workmanship of the Hammond Watch Co. I hope in the near future this magazine will be able to publish full description and diagrams of this wonderful full-toned and full-range instrument. (Editor's note: Such an article by R. B. Dogherty will appear next month.)

The organ in home use will need but a small amplifying system, but as it is used at the Ford Bowl, in order to get proper volume and acoustics, 92 units of amplification are needed. Each unit consists of one 573, four 2A3's and two 56's. There are two Model A-12 Jensen speakers to each unit of amplification and each unit good for about 20 watts output. This console is operated by a series of revolving discs driven by a 10 watt synchronous motor, each disc of which is cut to a particular note by means of small teeth revolving past the poles of permanent magnets which interrupt the flux at various frequencies. The total input to the amplifiers is 17,000 watts and the output is in the neighborhood of 2500 watts of audio power. Much credit must be given to Edward Nelson and Walter Martin, sound technicians at the Ford

(Continued on Page 25)
COURT DECISION

A court decision of far-reaching importance has just been handed down by Justice Eder of the 9th District Court of New York, in the matter of patents covering aluminum blanks used for recordings. The Universal Microphone Company of Inglewood, California, has long held a license for marketing and using aluminum discs and has pioneered units for use in aluminum recording. The new professional recording machine was perfected in May. Two years ago patent owners brought suit involving the process of recording on metal and the use of basic patents and improvements whereby aluminum discs were used to record voice, conversation, music, radio broadcasts, etc. The New York decision will be followed by other suits to protect the original rights, particularly in New York, California and Illinois, according to a representative of the patent owners, who claim coverage of all angles in the various patents.

SOME CONDENSER

An order for the largest mica dielectric fixed capacitors ever made has been successfully filled by the Cornell-Dubilier Corporation. Standing three feet high and twenty inches in diameter in their oil-filled aluminum cases and weighing 300 pounds each, these units are capable of carrying 150 Amperes of radio frequency current, at various operating voltages up to 15,000 volts, according to their designer, William Dubilier, vice-president of the company. This unusual power-handling capacity is made possible by a unique wheel-like construction. The capacitors consist of four rings of condenser units, each ring having six stacks of specially tested and impregnated condensers arranged radially around a central suspension shaft like the spokes of a wheel. The spokes are staggered to allow free circulation of the cooling oil. The actual capacitance is .02 mfd., and the power factor only .008 percent.

ALL WAVE MULTIPLE ANTENNA

For the past two years an attempt has been made to provide a suitable antenna system for use in radio stores, in small apartment houses or in other locations where more than one radio receiver is operated. Multiple antenna systems have for some time been more or less common but are unsuitable for use with all wave equipment. Arthur H. Lynch, Inc., has spent considerable time, effort and expense in developing a suitable all wave antenna system which will allow simultaneous operation of several receivers. A very severe and rigid test of the accuracy of this system proved its worth in a radio company in New York City whose various stores are located in sections of the city where subway, elevated, street car and automobile traffic is quite heavy. Here, these new aerials are rendering very effective service every day. A very important feature of this system is the fact that regardless of the number of receivers employed, it is necessary to use only one antenna transformer and one receiver transformer.

Ordinary alum, melted in a crucible or other container makes an excellent cement for joining glass, metal, china, etc. It makes a very strong joint and is impervious to water.
What is the exact inductance of that coil?
What is the exact resistance of that resistor?
What is the exact capacity of that condenser?
How is the power factor of that condenser?
How bad is the leakage in that condenser?

Is this condenser or that resistor or coil causing the trouble in a given stage or circuit?

Can you answer all these questions easily, quickly, accurately, definitely and without substituting any parts? You can with Triumph's newest instrument!

The new Triumph Model 500 Component Analyzer is truly the answer to a service technician's prayers—a dream come true!

A real professional laboratory instrument, housed in a beautiful walnut finished instrument case with hinged cover—it is an instrument you will be proud to own—it is rugged, accurate and you will appreciate its convenience.

Open and shorted parts show up instantly but in addition the Model 500 will show you actual values.

Resistance from five ohms to two megohms—capacity from .00005 mfd. to 20 mfd.—inductance from 50 microhenries to 20 millihenries. ALL DIRECT READING.

Binding posts are provided for external standards thus making easy the extension of the instrument's ranges.

Power factor can be shown as "GOOD" or "POOR" and leakage as "NORMAL" or "EXCESSIVE". Circuit continuity as high as four megohms may be checked. The instrument measures wet or dry electrolytic and paper condensers.

The Triumph Model 500 Condenser—Bridge—Analyzer measures 10" by 9½" by 5¼". Weight packed for shipment is 10 pounds. Operates on from 100 to 130 volts, 50 or 60 cycle power supply. A compartment is provided in the case for carrying test leads, phones and accessories.

Let your jobber show you how the Triumph Model 500 will pay for itself on a few "tough jobs" by time, labor and expense saved and customer good will increased.

Never before has the service technician been given real laboratory facilities at a price compatible with service profits.

$20.95 On The West Coast

KEEPING A PROMISE

Triumph stated that the Model 400 Tube Tester would not be obsoleted by ordinary changes in tubes. Triumph keeps this promise with the first "ORDINARY CHANGE" involving the introduction of ten new eight-prong all-metal tubes, to be announced to the trade July 1. Several weeks in advance of the availability of these tubes, Triumph is providing all owners of a Model 400 Tube Tester with test chart information and an eight-prong adapter ENTIRELY FREE OF CHARGE! It will only be necessary for owners to write to the factory giving the serial number of their instrument and information as to from whom it was purchased. The only expense will be postage charges.

TRIUMPH MFG. CO., 4017 W. Lake Street, Chicago

See These Distributors for Demonstration

RADIO SPECIALTIES COMPANY PACIFIC RADIO EXCHANGE
M. D. EALY J. L. MAHON DISTRIBUTORS, INC.
ELECTRIC PRODUCTS SERVICE ZACK RADIO SUPPLY CO.
WESTERN RADIO & ELECTRIC CO., San Diego
COAST ELECTRIC CO., San Diego
California Representative:
NORMAN B. NEELY, 1656 North Serrano Street, Los Angeles
### CALCULATING CARRYING CAPACITY OF RESISTORS

(Continued from Page 8)

It is of course impossible to give the figure for all possible cases in a table. The nearest approach one can make to such an ideal is to provide a chart and obtain sufficient accuracy to be of any use.

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Maximum Current Ratings of Standard Resistors

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### NEW SUPREME INSTRUMENTS

Electric Products Service, local factory service and distributors for Supreme instruments, announce they have received the new 1936 models of Supreme instruments. The new line consists of the following types in brief: the 89 Standard tube tester handling all the latest all-metal type tubes without adapters. The model 89 De-Lux tube tester has available voltage ranges of 0-1250 volts, ohm ranges from 0-200.0 ohms and meg-ohm-meter with ranges from 0-20 Megs. The 391 P. A. Analyzer has DC Milliampere ranges of 0-1250 M.A. AC and DC volts, 0-1250 volts, capacity ranges 0-12.5 mfd resistance ranges of 0-200,000 ohms and 0-20 Megs. The 391 P. A. Analyzer has DC Milliampere ranges of 0-1250 M.A. AC and DC volts, 0-1250 volts, capacity ranges 0-12.5 mfd resistance ranges of 0-200,000 ohms and 0-20 Megs. The 391 P. A. Analyzer has DC Milliampere ranges of 0-1250 M.A. AC and DC volts, 0-1250 volts, capacity ranges 0-12.5 mfd resistance ranges of 0-200,000 ohms and 0-20 Megs.

NEW TRIFIGHT GENERATOR

The Triumph Mfg. Company of Chicago announces the Model 150 Signal Generator essentially identical in characteristics and specifications to the Model 110. However, it is for battery operation rather than a.c. It is priced the same as the Model 110 including long-life heavy-duty batteries and tubes.

NEW — 1935 ALL-WAVE SETS

"Western made for Western Reception"
TRAVELING THE TERRITORY WITH MILTON

Yeah, man, another month and here we are again. By this time you boys all must know that the three most unpleasant sins in this world are death, taxes, and that column known as "Traveling the Territory. Oh, well.

We just rode across Harry Hoyt down at the Radio Maintenance Co., where he is doing his share keeping the customers satisfied. Harry has just returned from a vacation where he had the steady rays of Old Sol helped to turn his complexion as brown as the proverbial berry. As the story goes, it's best to be unburned on a vacation than tanned on one's week-end.

And speaking of Mexico we remember with a chuckle an incident in Juarez which caused considerable commotion for the moment. Just imagine an individual, not getting enough excitement out of his ordinary bullfight, who by fire crackers in the arena to stimulate the situation a bit. For full particulars on the subject just call, write or phone to Santa Barbara, has started the radio fraternity in Los Angeles. We'll be seeing you, Mel.

And those of you who have been wondering what happened to "Des" Elder can find him plodding away with the Pretty Needle Swing! So says our good friend B. C. Ford (no relation to Henry) of the Electric Products Service when showing his customer that the meter under observation has been repaired 100 per cent. O. K. Meters to the right of us, meters to the left of us—Holy Moses! More movements than Ziegfeld's chorus!

By the time this edition will have gone to press a certain Phil Kudler, who keeps the dealers in good humor at Radio Television Supply, will be enjoying a blissful honeymoon in Catalina. Lucky fellow! And he deserves it, too.

Western Avenue, starts making those 40 yo hot Yeah man; when Bill Hilchey at the Wilshire Radio Service on South Western Avenue, starts making those 40 yo hot Yeah man: when Bill Hilchey at the Wilshire Radio Service on South Western Avenue, starts making those 40 yo hot Yeah man: when Bill Hilchey at the Wilshire Radio Service on South Western Avenue, starts making those 40 yo hot Yeah man: when Bill Hilchey at the Wilshire Radio Service on South Western Avenue, starts making those 40 yo hot Yeah man.

We take this opportunity of greeting an old friend, Al Ferris, who now observes and is observed at Pacific Radio Exchange. Good luck, Al.

...
ARCTURUS DEVELOPS NEW TUBE LINE

The Arcturus Radio Tube Company, Newark, N.J., has developed and marketed a new line of tubes, designated as the "G" series, which is identical in electrical characteristics and pin connections to the all-metal tubes. It is stated that several of the larger set manufacturers and many smaller ones have already developed circuits employing these new "G" tubes. Early announcement of some of the developed circuits is expected. Several of the larger set manufacturers have been expecting new "G" tubes. The Du Mont line is one of the most complete on the market including special purpose tubes as well as those adapted to television. The Du Mont tubes have high intensity short persistence screens and a very high voltage sensitivity. The Du Mont oscillograph is designed to accommodate either a 3-inch or a 5-inch tube interchangeably. Mr. Mahon will be glad to discuss these products with readers of the "Technician" and offer his assistance on your oscillograph problems.

CATHODE RAY TUBE DISTRIBUTOR APPOINTED

J. L. MAHON, local Sylvania tube distributor, of 1358 S. Grand Avenue, announces his appointment as distributor for the Allen B. Du Mont laboratories, pioneer manufacturer of cathode ray tubes and oscillographs. The Du Mont line is one of the most complete on the market including special purpose tubes as well as those adapted to television. The Du Mont tubes have high intensity short persistence screens and a very high voltage sensitivity. The Du Mont oscillograph is designed to accommodate either a 3-inch or a 5-inch tube interchangeably. Mr. Mahon will be glad to discuss these products with readers of the "Technician" and offer his assistance on your oscillograph problems.

UNIVERSAL BOOKLET

E. E. Griffin, chief engineer of the Universal Microphone Co., has written a 16-page booklet, "Advanced Disc Recording" as the successor of "Simplified Disc Recording" which was published a year ago. It discusses the various types of discs, needles, lead screws, advantages of pregrooved and ungrooved discs, playback procedure, recording heads, turntable speeds, hum level, amplification, stroboscope and other topics. A small charge of a dime has been placed on your oscillograph problems.

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---at---

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A Wholesale Radio House With A Million Parts
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HAVE YOU SEEN THE NEW TRIUMPH MODEL 500?

CONDENSER — BRIDGE — ANALYSER

It tests coils, condensers, resistors, right in the set—
Eliminates crude "cut and try" and "parts substitution" methods.
Measures 50 microhens to 20 millihens—0.0005 mfd. to 20 mfd.—5 ohms to 2 megohms.
All ranges can be conveniently extended by using external standards.
Also tests leakage of all types of paper and wet or dry electrolytic condensers of all common capacities and voltages. Indicates power factor as "good" or "bad".

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LET US SHOW YOU THIS INSTRUMENT
CONVENIENT TERMS IF DESIRED

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

EARNshaw TO MOVE

Hollywood, long a center for sound activities of films and transcriptions, is also becoming a headquarters for program-builders.
On June 1 Harry A. Earnshaw moved his radio interests to the Warner Bros. Hollywood Theatre Building, after centering his activities in the Petroleum Securities Bldg., Los Angeles, for nearly eight years. The firm includes the Earnshaw Radio Productions and Earnshaw-Young, Inc.

The move was made because of the proximity in Hollywood to technical recording laboratories and the source of talent.

Chandu, Black and Blue, Count of Monte Cristo and scores of other notable transcription successes have come from the pen of Mr. Earnshaw in recent years.

Fifty years ago, in 1885, the lineotype type-setting machine was invented by Mergenthal.

NEW MIKE STAND

Stock model microphone stands from the Universal Microphone Co., Inglewood, Cal., will hereafter be equipped with a detachable lightweight copy holder for attaching announcers' notes, music and lecture memos. There will be no increase in net prices. The frame, fashioned of frosted cadmium, is curved at the bottom to securely hold letterhead or smaller size sheets with sufficient room for pencils. It operates on a flexible arm and is easily and quickly adjusted or removed. It has been designed as the result of a survey among broadcasters to determine what improvement, if any, could be made on floor model stands. More than 60% of the station announcers interviewed voiced the expression that such a gadget would fill a long felt need among those who appear frequently before the microphone.

After washing hands in gasoline the unpleasing odor may be removed by rubbing them with moistened salt.
ADJUSTING RECORDER HEADS

In the sketch may be seen the four damping adjustment screws (A) for the initial adjustment, (sealed at factory) the blocks (B) are tightened and so aligned that the gap between the poles and armature is equalized. The especially constructed alloy metal strip, between the blocks and upon which the armature is mounted, is drawn to the right tension to tune out any resonance therein by the screws (C). The armature spacing obtained, the dampers are brought into play. As stated before, the dampers accomplish many things—restricting the movement of the stylus, preventing the armature from striking the poles, and damping the movement in such a way that the recorder may be tuned to the desired frequency response upon the material to be recorded upon.

Now, how will you know when the proper tuning is obtained? Of course, the final test is upon the recording of material expected to be used, but other methods of testing are much quicker.

The recording head should be fitted with an ordinary steel phonograph needle tightly secured in the armature. The recording may be held in one hand and adjusted with the other, after pushing the steel needle into the edge of a thin partition such as that from a cigar box. An audio signal applied to the head should produce a loud speaker effect. Sound boards of the recorders are rather high in pitch, that is to say, they don't reproduce the lows because of the small baffle. This is entirely satisfactory since the recording man is interested in the resonant peaks in the higher frequencies and not in the lower range which is free of such annoyances. In the event that the tone quality is distorted, the dampers should be adjusted in opposite pairs, first, the top and then the bottom. When the damping is balanced on either side of the armature, the distortion clears away and a clear, brilliant tone is the characteristic.

Each type of recording material has its own particular requirements as regards damping of the recording head. In all cases the damping should be balanced so that the upper half of the armature is damped to the same degree as the lower half. Thus it is seen that recording upon Universal Aluminum discs, the lower dampers may be loosened slightly to take care of the damping action in grooving the metal, thus providing a greater power transfer, requiring less power to give the same results. Soft materials should be recorded upon heads having the armature more equally balanced, since these materials offer but little resistance to the movement of the stylus. Greater overall damping provides more stability of operation in handling a large amount of power.

Use of the Universal Power Recording Head on the new Silverman groove is superior to pressings from wax due to the low groove noise, no processing required for playback, and the wide frequency range of the instrument and Silveroid material. Transcription men with amplifiers of good frequency response will find that they can not expect the same results from their transcriptions when a good cutting head is not placed at the output of their amplifiers. “The Listening Post” is not placed at the microphone to record material, just as in high fidelity radio reception—one condenser or one tube will upset the range and the goal is lost. A real good recording head should be the transcription man’s first step in the direction of quality recordings for his clients.

RADIO FELLOWSHIP ACTIVE

The Radio Fellowship, a chapter of the DXer’s Alliance, is quite active and is attracting substantial numbers of prominent citizens and outstanding figures of the radio industry in Southern California. Their regular meetings once a month are supplemented by listening activities in advance of the meeting. The officers can serve as efficiently and unselfishly as the present ones. Mr. Howard, of Inca Transformer, spoke at the last meeting on the “Iron Tube and Construction of Inca Transformers.” Door prize consisting of long-nose pliers, needle-nose tweezers and a small crescent wrench were won by President Art Hunt.

RADIO TECHNICIANS OF SAN DIEGO

Use of Laboratory Equipment at Service Instrument

MAGAZINE, CONSOLIDATION

According to latest reports, the amateur magazines “RADIO” and “Calla-Hot” are consolidating the composite magazine to be known as “Radio” and published in Los Angeles. Publication under the new arrangement is scheduled to start in July. The consolidation of three such excellent amateur publications should undoubtedly result in a “ham” magazine par excellence. Congratulations and best wishes!
ORME ADVANCES

Mr. John A. Orme, Vice-President of the CRTA, has disposed of his holdings in the Technical Service Laboratories and has accepted the position of Chief Engineer of the Electronic Research Laboratory. Mr. Orme was chosen by this firm because of his extensive experience in research development and construction of vacuum tubes and acoustical devices. We wish him much success in his new venture.

RADIO SPECIALTIES ENLARGES

The Radio Specialties Company, well-known radio parts jobbers, has recently purchased the entire stock and accounts of the Electro-Distributing Company, formerly operated by Mr. Michelson. This ever-expanding firm which has added several new members to its staff in the past few months is further extending its facilities to properly care for the customers of the concern which it has absorbed.

NEW CLOUGH-BRENGLE SIGNAL GENERATOR

Electric Products Service, local distributors and factory service for Clough-Brengle equipment, announce that they have just received the new Model "OM" Signal Generator, which is essentially similar to the Model "OC" with the addition of a beat note frequency modulation circuit necessary for reproducing selectivity-sensitivity curves on a Cathode-Ray oscilloscope.

The inherent shortcomings of frequency modulation systems, where a motor-driven condenser is connected directly across the oscillator tuning condenser; i.e., destruction of calibration by the added capacity of the leads and motor-driven condenser, and the fact that a selectivity curve width cannot be secured at all test frequencies, are eliminated by this newly developed circuit.

The calibration of the signal generator is made in terms of the resultant frequency of the two oscillators within the two units so that there is no addition or subtraction of frequencies in order to find the true output frequency of the instrument as calibrated frequency denotes the exact center resonant point between the 15 kc. minus and 15 kc. plus sweep or in other words the definite direct beat resonant frequencies.

The manufacturers claim that this new signal generator is the only commercial type of this description obtainable with the advantages of being able positively to show directly on the screen of the oscilloscope varying selectivity curve width and sensitivity of a receiver at different portions of the frequency band which is covered.

Universal Combination Floor Stand

A rugged, three-piece, telescoping combination banquet and floor stand—Compact—Light Weight—Smooth in Operation—Finished in fully polished nickel plate—Equipped with cadmium plated, adjustable and detachable copy holder, mounted on a flexible steel arm—a clean, workmanlike job, designed and manufactured to Universal standards of quality. List Price, complete with 8 springs, $10.00

UNIVERSAL MODEL "E"

With A. C. Humless Power Supply

Completely assembled—A.C. operated—Ready-to-use Model "E" condenser microphone unit. Guaranteed as silent as batteries—yet without battery expense or annoyance—Two-stage amplifier with No. 230 tubes—Model E microphone with 90° swivel head; barometric adjustment; solid cast grating diaphragm protection—Frequency response from 35 to 10,000 cycles—A quality unit offered at the lowest price consistent with Universal standards. List $100.00 Complete

Universal Microphone Co.

424 Warren Lane, Inglewood, California

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TUBE CHECKERS and SET ANALYZERS

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TRIUMPH HIGH PRECISION INSTRUMENTS

SIGNAL GENERATORS—TUBE TESTERS—MULTI RANGE METERS CONDENSER BRIDGE-ANALYZERS

Let us show you how the new Model 500 Condenser-Bridge Analyzer will soon pay for itself in time, labor and call-backs saved.

PACIFIC RADIO EXCHANGE, Inc.

729-31 South Main Street
Trinity 2926-7-8
WIDE RANGE PICK UP

The Universal Microphone Co., Inglewood, Calif., has started to produce a new item in its Universal full frequency pickup. Previously its catalog item along these lines was a combination pickup and recorder. The new instrument is for playback only of all types of instantaneous records, especially those of aluminum, Silveroid and other semi-plastic substances. The pickup is designed for the widest possible frequency reproduction with maximum volume of output. The adjustable arm can be extended to sixteen inches and allows a proper playback position for any size of record disc. The device is ball bearing mounted and eliminates side wear of the grooves. A thumb screw makes it possible to quickly and easily adjust pressure to a featherweight on the needle.

Adding a pinch of salt to the water in which cut flowers are placed will make them last longer.

The world’s loudest noise, the volcanic explosion of Krakatoa in 1883, was heard by human ears as far away as Bangkok, a distance of over 1400 miles.

NOKORODE POPULAR

Mr. Frank Chapman, President of the M. W. Dunton Company, manufacturers of Nokorode products, who is spending several months in Southern California, reports increasing popularity of Nokorode products in this territory. This company, manufacturers of Nokorode soldering paste for many, many years, has developed an outstanding line of acid-core, resin-core and Nokorode-core solder. These solders being all virgin metal and having a lower melting temperature enable all technicians to perform better soldering jobs with less time, effort and expense. Nokorode Salts, another product of this company is most excellent for keeping iron tips in order easily without constant filing and without danger of pitting the copper.

After seven years of study and research by Dr. E. E. Ecker and his assistant, Loyal Weeds, of Western Reserve University, they were rewarded by the development of an antiseptic 1200 times as powerful as carbolic acid which is non-corrosive to surgical instruments and non-poisonous.
HOW TO SOLDER
(Continued from page 21)

Number 3—It is desirable that the tools be soldered be clean, the cleaner the joint to be soldered. A well heated joint causes the solder to flow smoothly and even and uses very little solder to do a good job, as well as a smaller amount of flux. Look at the soldering jobs that come your way. Try the suggestions given herein and see how much better soldering you can do. Attention to details will let you do soldering which will surprise you, and it is SO VERY EASY to do a good job if reasonable care and precautions are taken.

If you use an electric soldering iron, see to it that the point does not get too hot it keeps the tinning burned off. If using a common soldering copper, such as the plumber or sheet metal men, DON'T heat the point and burn off the tinning, but fix your stove so that the "butt" of the copper gets the heat, that is why the butt is made heavier, you can heat it very nicely by sticking the point down through the hole in a gas stove and letting the flame come up around the butt, unless it gets too hot it will not burn off the tinning. Above all, never use Sal Ammoniac in any form if you want real good work.

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