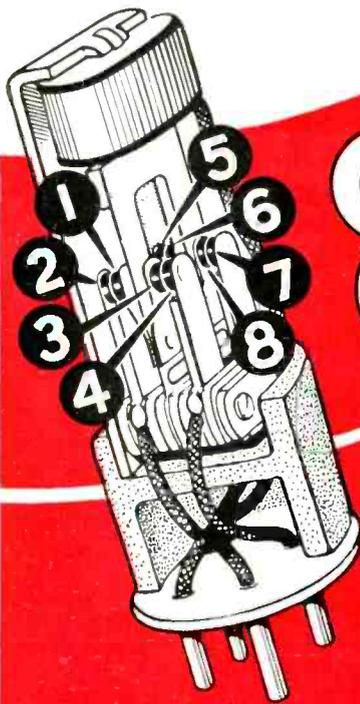


COUNT THEM



8 CONTACTS
... mean longer life for
MALLORY VIBRATORS!

8 CONTACTS ... yet
MALLORY VIBRATORS
cost no more!

8 CONTACTS ... no wonder
more than 3 million
MALLORY VIBRATORS
are now in use!



..COUNT ON MALLORY

P. R. MALLORY & CO., Inc.

Replacement Vibrators

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Servicing is never a question for the man who depends on Mallory (8 contact) Replacement Vibrators. Why? Because they create new standards of vibrator practice. They save time, inventory — stock investment. They are dependable in service, easy to install — and cost no more than ordinary products!

Use

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REPLACEMENT
CONDENSERS... VIBRATORS

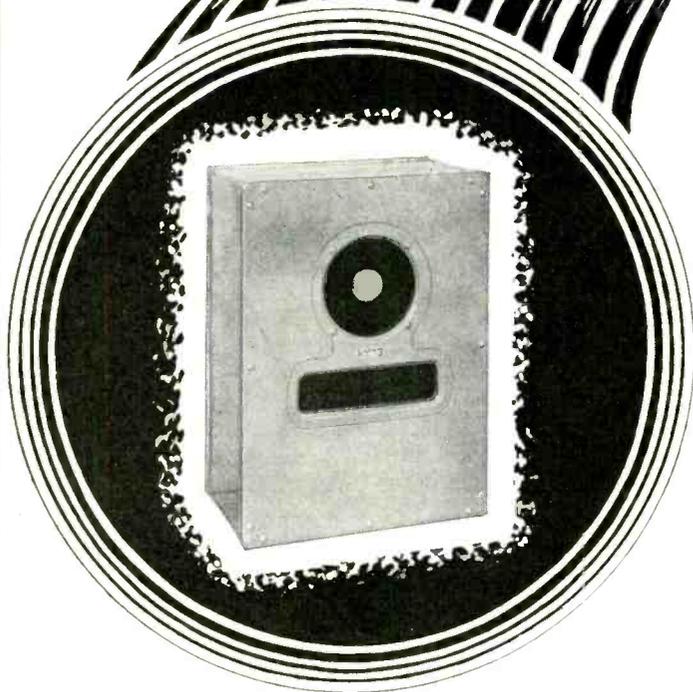
P. R. MALLORY & CO., Inc.
INDIANAPOLIS INDIANA
Cable Address — PELMALLO

Use

YAXLEY
REPLACEMENT
VOLUME CONTROLS

A NEW DAY

... IN THE ART OF
SOUND REINFORCEMENT
AND REPRODUCTION



- The Day of the *Bass Reflex* and *Peri-Dynamic* Principles . . . Basic New Art Which Will Dominate the Whole Future of the Industry. . . .
- The Day of the *Complete Loud Speaker* . . . No Baffle Required . . . Makeshift Baffles and Boxes Are Now As Out of Date as a Hand Crank for the Automobile. . . .

Jensen

PERI-DYNAMIC REPRODUCERS

Models KM and KV

For every known application of loud speakers . . . Radio Sets, Speech and Music reinforcement, Stage and Floor Show reinforcement, Hotels, Schools, Studios, Homes, etc. . . . These new reproducers are undeniably the greatest advancement since the electro dynamic speaker . . . with new and specific performance ability engineered by the Jensen Laboratory and brought direct to the field of application.

Model KM Reproducer—Four sizes for 8, 10, 12 or 15-inch speakers, all with *Bass Reflex*, essential to the best reproduction in music, adds new octaves of low frequency. Speech is crisp and intelligible. Actually, performance is better than an infinite baffle. Prices as low as \$20.50 complete with highly efficient Jensen 8-inch speaker.

Model KV Reproducer—Three sizes for 8, 10 or 12 inch speakers, designed for really understandable speech reinforcement. The lower frequencies, not essential to good voice reproduction are eliminated. These models are relatively smaller than "KM" Models because of their function. Prices are as low as \$12.50 complete with Jensen 8-inch speaker.

Models KM and KV are shipped in kits consisting of speaker and knock-down enclosure. Easy to assemble . . . only a screw driver is needed. Enclosures are finished in French gray, giving attractive appearance. But they can be readily painted over to harmonize with any surroundings. Thus the innovation not only brings an entirely new standard of performance to the industry but also solves the baffle problem in a convenient and highly practical manner. **But there is no price premium for these advantages; check this statement carefully!**



Note convenient flat package in which enclosure is shipped . . . the speaker carton is also shown.

These outstandingly new Jensen products are additions to what has always been the most complete line of loud speakers and accessory equipment. Thus, the field of operation and profits for Jensen jobbers and dealers continues to expand.

Jensen

"The Name
Insures the Quality"

JENSEN RADIO MANUFACTURING COMPANY S-737 **FREE**
6601 S. Laramie Avenue, Chicago, Ill.

Please send me Free 12-page folder, "The Guide to a New Day" and other descriptive literature . . . giving complete technical information about these new Jensen Peri-Dynamic Reproducers.

Name

Address

City..... State.....

SERVICE

A Monthly Digest of Radio and Allied Maintenance

Reg. U. S. Patent Office. Member, Audit Bureau of Circulations

EDITOR

Robert G. Herzog

JULY, 1937

VOL. 6, NO. 7

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ANTENNA

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*Eastern
Air Lines*

- GO CENTRALAB ALL THE WAY



● Thanks! EASTERN AIR LINES, for your gratifying answer to our questionnaire. We are proud to play our part so successfully in maintaining uninterrupted communication between these giant ships of the air and their ground stations. Eastern Air Lines remarkable record of performance is in no small measure the result of infinite attention to detail . . . and Centralab fits into that scheme with jeweled perfection. For broadcast receivers—for aviation—for replacements . . . wherever smooth reception is wanted . . . "Go Centralab all the Way."

Centralab variable resistors have been giving very satisfactory service in our ground station and aircraft applications. We find them dependable and economical for many varied applications in our communications equipment.

DON C. McRAE,
Superintendent of Communications

Centralab controls have given excellent service under the exacting requirements of our communications service.

Dependable, noise-free operation has been obtained under extreme ranges of temperature and humidity.

C. H. BATES,
Supervisor, Radio Engineering

We have found Centralab volume controls to be entirely satisfactory in aircraft and ground radio equipment. You cannot surpass them for economy and satisfactory operation.

G. E. SMITH,
Asst. Supt. of Communications

Centralab
CRL

Division of Globe Union Inc., Milwaukee
Canterbury Rd. Kilburn N.W., England 118 Ave. Ledru-Rollin, Paris

JULY, 1937 •

SAY YOU SAW IT IN SERVICE

405

THE ANTENNA . . .

P-A STEPS OUT

THOSE OF US WHO HAVE seen the motion picture "History Is Made at Night" will undoubtedly remember the scene where the huge blue ribbon liner collides with an iceberg. The frightened passengers were calmed by a soothing voice which directed their rescue and kept up their morale. The voice came over loudspeakers, part of a public address system installed on the ship.

That voyagers on ships similarly distressed might obtain the benefits of such safety devices the Bureau of Steamboat Inspection, Department of Commerce, has recently passed a law which will make it compulsory for larger passenger ships to install emergency p-a equipment, before January 1938, at lifeboat stations throughout the ship.

Many ships are already installing such equipment which can readily be expanded with phonograph and radio tuner attachments to provide news, entertainment, etc., for the passengers. The officers of the ship are also enabled to keep in closer touch with the crew and passengers.

The above example is only one of the many ever increasing uses found for this versatile equipment. We have on numerous occasions remarked that p-a systems will find use in a host of applications yet to be conceived.

While driving along a national highway one morning we were greeted by a pleasant voice which informed us:

"Your lights are on."

We are all familiar with the police public address car which cruises up and down the highways directing traffic, cautioning drivers and saving lives.

We encountered a close relative of the above in the form of a loud announcement (obviously from a phonograph record suitably amplified) at a fork in the road:

"To the left for the Holland Tunnel, to the right for the George Washington Bridge. . . ."

This is indeed a far cry from the small sign post which only served to cause traffic jams at every cross road because of poor readability.

A large transportation company in New York City has started to install p-a equipment in its buses for proper cautioning of passengers on entering or leaving the vehicles.

The field has barely been scratched. We look forward to the day when a smooth, well modulated tenor will greet us over loudspeakers, in place of the hoarse, cracked bass which now warns us to:

"Watch your step, let 'em out foist . . ." while we are being swept out of trains with the crowd.

An attempt was made in that direction years ago but the equipment available at the time was much too crude to be satisfactory.

What a lot of time a system could save in a public hospital, properly installed with suitable automatic adjustments.

"The patient is doing very nicely . . ." could easily be recorded on a phonograph record.

We can multiply these instances indefinitely and no doubt you could supply many more novel and ingenious applications. But, enough, the possibilities are beginning to stagger our imagination. It remains only for you to put your own imagination to work and go out and sell p-a equipment for every possible service. Get yourself talked about in your locality for unique installations and incidentally garner a profitable source of revenue.

• • •

SERVICE MEN'S ASSOCIATIONS

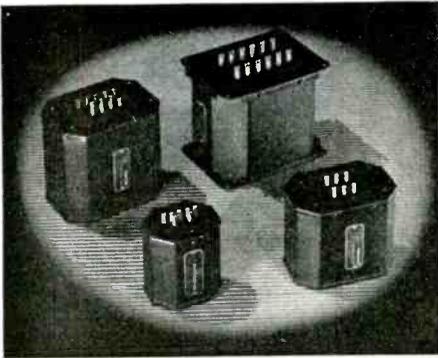
RECENTLY, IN THESE COLUMNS, we expressed the belief that one of the functions of a Service Men's Association was to give voice to the common complaints of the members when and where it would do the most good . . . using the weight of numbers to accomplish something toward remedying the grievances.

We are pleased to note that several organizations have taken heed of our advice. A Mid-West association reports that they have persuaded the publishers of the classified telephone directory for their city to refuse, as unethical, radio service advertising which promises either free radio service or fixed price radio service. . . . They are endeavoring to convince the daily newspapers and the local radio stations along the same lines.

Another instance of cooperation with associations comes from New England. A jobber has announced that he will give trade discounts only to those Service Men who could show affiliation with one of the several Service Men's associations in the territory.

PUBLIC ADDRESS COMPONENTS

The Public Address series of audio, filter and power units described below are designed to satisfy the demand for a popular priced quality line having the many exclusive and Universal features associated with UTC products. All cases are finished in a black eggshell enamel to suit exacting commercial requirements as to appearance. Each transformer may be fastened to chassis or rack panel with lugs either at top or bottom. The housings are physically symmetrical and similar in construction and when grouped in finished equipment present a thoroughly professional appearance. Transformers like the PA-134, 135 and 136, are now manufactured in the hum-bucking type of construction. In consequence they have an extremely low hum pickup and are excellent for low level work. These line to grid units use hiperm-alloy core structure for maximum PA fidelity requirements.



INPUT TRANSFORMERS, CLASS A

PA-131 Transformer from 1 plate to 1 grid. 3:1 ratio. PA-1 Net.....\$2.70
 PA-132 From 1 plate to 2 grids. 2:1 ratio each side. Split sec. PA-1 Hum balanced coils used. Net.....\$3.00
 PA-133 From 2 plates to 2 grids. 1:75 ratio each side. Primary and secondary each in two sections. PA-1 Net.....\$3.60
 PA-233 From two 56, 6C6 triode, 6C5, or similar tubes to push pull 45's, 2A3's or 6L6's self or fixed bias. PA-1 Net.....\$3.60
 PA-333 This input transformer is designed to operate from 6C5's, or similar driver tubes to two 6L6's fixed bias. PA-1 Net.....\$3.60
 PA-433 From 45 or 2A3 plates to two or four fixed bias 6L6 grids. PA-2 Net.....\$3.90
 PA-134 500, 200, or 50 ohm line to single grid. PA-1 Net.....\$3.90
 PA-135 500, 200, or 50 ohm line to push pull grids. PA-1 Net.....\$4.50
 PA-136 Single plate or pickup and carbon mike or low impedance pickup to one or two grids. PA-1 Net.....\$4.50

MIXING, MATCHING TRANSFORMERS

PA-137 Mixing 500, 200, or 50 ohm line to 500, 200 or 50 ohm line. PA-1 Net.....\$3.30
 PA-138 Audio line matching. Will handle 20 watts audio power. Input 500 or 200 ohm line. Output 16, 8, 5, 3 and 1.5 ohms. PA-2 Net.....\$4.50
 PA-139 Audio line matching. Will handle 30 watts audio power. Input 500 or 200 ohm line. Output 16, 8, 5, 3, 1.5 ohms. PA-3 Net.....\$7.50

NEW VARIMATCH INPUT TRANSFORMERS

PA-49 Push pull 45, 59 or 6L6 plates to push pull 845A prime grids. PA-2. Net price.....\$4.50

PA-50AX Single 53, 56, 6C5, 6C6 triode, 6A6 to Class B 53, 6A6 or 6E6 grids or single 89 to Class B 89 grids. PA-1. Net price.....\$3.30

PA-51AX Single 46 or 6L6 to Class B 46 or 59 grids. Single 45, 59, 2A3 or 6L6 to Class B 46 or 59 grids. Single 49 to Class B 49 grids. Single 37, 76, 6C6 or 6C5 triode to Class B 19 or 79 grids. Single 30 to Class B 19 or 79 grids. Single 89 to Class B 19 or 79 grids. Single 2A5, 42, 45 triode plate

to A prime 45's, 2A5's or 42's. PA-1. Net price.....\$3.30

PA-52AX Push pull, 45, 59, 2A3 or 6L6 plates to 2-46 Class B grids. Push pull 45, 59, 2A3 or 6L6 plates to 4-46 or 59 Class B grids. Push pull 2A3's to 2-841 Class B grids. PA-2. Net price.....\$3.90

PA-53AX Push pull 42, 45, 50, 59, 2A3 or 6L6 plates to two 210, 801, RK-18, 35T or 800 Class B grids. Push pull 2A-3 plates to two 838, 203A, 50T, 35T, 211A, 242A, 830B, 800, RK-18, 801 or 210 Class B grids. PA-2. Net price.....\$4.50

PA VARIMATCH TRANSFORMERS

PVM-1 For all audio tubes up to 12 watts audio. Output 500, 200, 15, 8, 5, 3, 1 1/2 ohms. Some typical tubes single or push pull: 19, 31, 33, 41, 42, 43, 45, 47, 48, 49, 53, 59, 71A, 79, 89, 2A3, 2A5, 6A6, 6F6, 6V6, 25A6, 25L6. PA-1. Net price.....\$3.00

PVM-2 For all audio tubes up to 30 watts audio. Output 500, 200, 16, 8, 5, 3, 1 1/2 ohms. Some typical tubes for single, push pull, or push pull parallel: 19, 31, 33, 41, 42, 43, 45, 46, 47, 48, 49, 50, 52A, 300A, 53, 59, 71A, 79, 89, 841, 843, 1602, 2A3, 2A5, 6A6, 6F6, 6L6, 6V6, 25A6, 25L6. PA-2. Net price.....\$4.80

PVM-3 For all audio tubes up to 60 watts audio. Output 500, 200, 16, 8, 5, 3, 1 1/2 ohms.

Some typical tubes in push pull parallel: 42's, 45's, 46's, 50's, 52's, 300A's, 59's, 2A3's, 2A5's, 6F6's. In push pull self or fixed bias: 6L6's, 10's, 807's, 801's. PA-3. Net price.....\$7.50

PVM-4 For all audio tubes up to 125 watts audio. Output 500, 200, 16, 8, 5, 3, 1 1/2 ohms. Some typical tubes push pull parallel: 6L6's, 10's, 807's, 801's, push pull 845's, 800's etc. PA-4. Net price.....\$12.00

PVM-5 For all audio tubes up to 300 watts audio. Output 500, 200, 16, 8, 5, 3, 1 1/2 ohms. Typical tubes: 211, 242A, 203A, 830B, 852, 838, 4-800's, 4-845's, ZB 120, etc. PA-5. Net price.....\$19.50

LINE VARIMATCH UNITS

The UTC Line Varimatch Units will match any voice coil or group of voice coils to a 500 ohm line. Impedance range is from .2 to 75 ohms in 50 combinations. UTC Line Varimatch Autoformers will match one to ten 500 ohm lines or LVM 500 ohm windings to the 500 ohm output of an audio amplifier.

LVM-1 15 Watt Line Varimatch unit. 500 ohms to variable voice coil winding of .2 to 75 ohms. PA-1 case. Net price.....\$2.70

LVM-2 40 Watt Line Varimatch unit. 500 ohms to voice coil winding of .2 to 75 ohms. PA-2 case. Net price.....\$4.20

LVM-3 75 Watt Line Varimatch unit. 500 ohms to voice coil winding of .2 to 75 ohms. PA-3 case. Net price.....\$6.00

LVM-10 Line Varimatch Autoformer. 500, 250, 167, 125, 100, 83, 71, 62, 50 ohms. 12 Watts. PA-1 case. Net price.....\$2.70

LVM-11 Line Varimatch Autoformer. 500, 250, 167, 125, 100, 83, 71, 62, 50 ohms. 30 Watts. PA-2 case. Net price.....\$4.20

LVM-12 Line Varimatch Autoformer. 500, 250, 167, 125, 100, 83, 71, 62, 50 ohms. 60 Watts. PA-3 case. Net price.....\$6.00

LVM-13 Line Varimatch Autoformer. 500, 250, 167, 125, 100, 83, 71, 62, 50 ohms. 125 Watts. PA-4 case. Net price.....\$10.80

LVM-14 Line Varimatch Autoformer. 500, 250, 167, 125, 100, 83, 71, 62, 50 ohms. 300 Watts. PA-5 case. Net price.....\$15.00

UTC VARITONE UNITS



The UTC Varitone is a revolutionary audio device which permits full control of the frequency response of any audio amplifier or receiver. Using this device, tone correction can be effected for defects in acoustic conditions or overall audio response. It is also possible to produce new tonal effects from phonograph recordings or radio reception and to bring back notes which would otherwise be lost completely. Due to the high equalization obtainable with the Varitone, some loss in gain is effected. If the amplifier or receiver does not have gain to spare, it may be necessary to add an additional stage of audio

frequency amplification. The Varitone is made in five types.

VT-1 This Varitone is incorporated with a universal audio transformer. Two primaries are provided. One is suitable for working from a single or double button microphone a low impedance pickup, or a line; the other primary is designed to work out of the plate of a tube or from a high impedance pickup. The secondary winding is centertapped and is equally suitable for working into one or two grids. Net price.....\$5.10

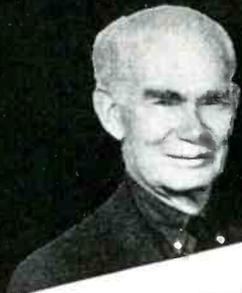
Four other Varitone models are also available. For details ask your distributor for sheet No. 1120.

UNITED TRANSFORMER CORP.

72 SPRING STREET

NEW YORK, N. Y.

EXPORT DIVISION: 100 VARICK STREET NEW YORK, N. Y. CABLES: "ARLAB"



"YOUR NEW MODEL 502 HAS ALMOST SUPER-HUMAN ABILITY!"

SIGNED

Lee de Forest

LEE DE FOREST LABORATORIES
RADIO ELECTRONICS
145 WEST 45TH STREET
NEW YORK 19, N.Y.

June 1st, 1937

Supreme Instruments Corporation
Greenwood, Mississippi

Gentlemen:

May I take this opportunity to congratulate the Supreme Instrument Corporation on their consistent effort to improve the radio industry in general, and the service industry in particular, by making available such excellent test equipment as the Model 502 Tube Tester.

Having pioneered in the research and development of radio tubes, I was particularly interested in the results attained by the Model 502 Automatic tube testing circuit.

I was especially surprised by its ability to accurately discard tubes which should be reworked or replaced, and tubes which should be replaced by reason of repaired or "good" tubes in storage. It apparently has the "good" tubes from the dealer, regardless of type, number of elements or filament terminations.

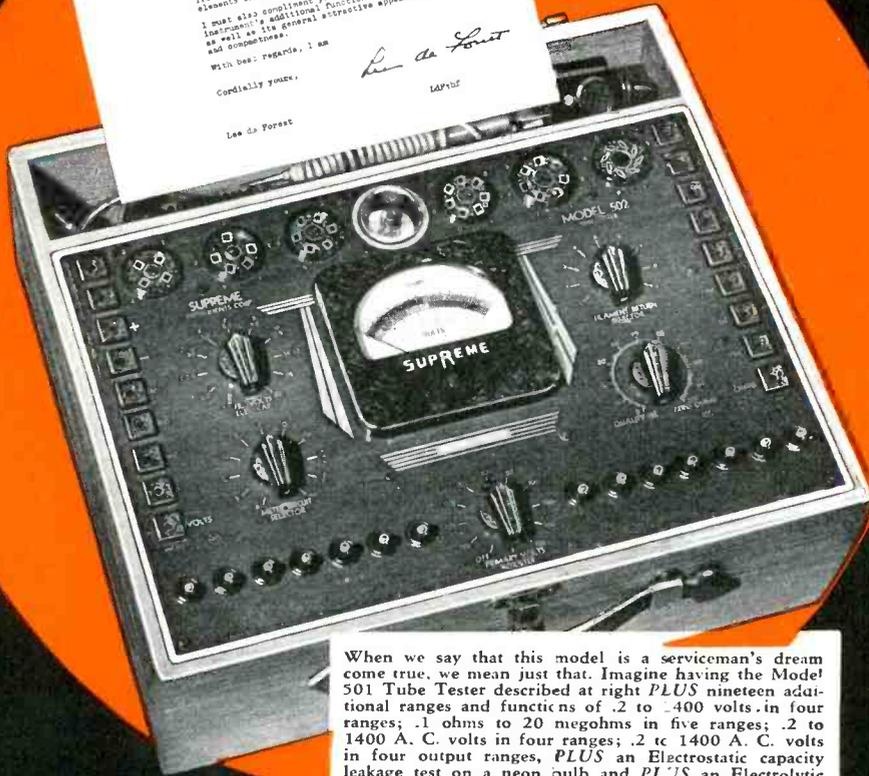
I must also compliment your company on this instrument's additional functions and range as well as its general attractive appearance and compactness. I am

With best regards, I am

Cordially yours,

Lee de Forest

Lee de Forest



When we say that this model is a serviceman's dream come true, we mean just that. Imagine having the Model 501 Tube Tester described at right PLUS nineteen additional ranges and functions of .2 to 400 volts in four ranges; .1 ohms to 20 megohms in five ranges; .2 to 1400 A. C. volts in four ranges; .2 to 1400 A. C. volts in four output ranges, PLUS an Electrostatic capacity leakage test on a neon bulb and PLUS an Electrolytic filter capacity leakage test on a "Coed-Bad" English reading scale. A complete, quality tube tester and set tester in a space 10 1/2" x 14 1/2" x 5", weighing only 16 lbs. at this new low price.

Dealer's Net Cash Price Model 502 \$49.95
Or, \$5.50 cash and 10 monthly payments of \$4.95

Everybody is talking about the new 1938 SUPREME instruments — the HIT of the Chicago Radio Show!

Both servicemen and jobbers alike are loud in their praise of these smaller, lighter and more compact instruments!

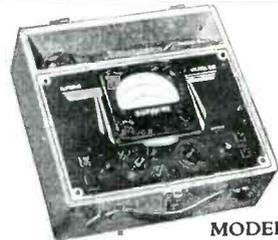
Each designed around SUPREME'S new flush-panel meter, built to new high standards of precision by Westinghouse. Beautifully modeled in antique Bronze panels with Golden Oak carrying cases. Perfectly engineered, these SUPREME instruments are destined to sweep the service industry like wild fire, and bring you a complete new conception of operating ease and accurate results that COUNT!

Never before has so much instrument been offered for so little money. And remember, these new SUPREME instruments are all available on the S. I. C. Payment Plan — the world's easiest installment terms!

SOLD ON SUPREME S.I.C. TERMS—THE WORLD'S EASIEST-INSTALLMENT TERMS

SUPREME INSTRUMENTS CORP.
GREENWOOD, MISSISSIPPI

Export Dept., Associated Exporters Co., 145 W. 45th St., New York City
Cable Address LOPREH, New York



MODEL 541

Here is the sweetest and fastest little Set Tester ever offered a serviceman at any price. Measuring only 7 1/4 x 10 1/4 x 4 1/2" and weighing but 9 pounds, 20 ranges and functions are at your finger tips on a single selector switch.

Here you have 2 to 1400 A. C. volts in four ranges; .2 to 1400 D. C. volts in four ranges; .2 to 1400 D. C. mls in three ranges; .2 to 1400 A. C. volts in four output ranges; .1 ohm to 20 megohms in five ranges (all self-contained)—and look at the price!

Dealer's Net Cash Price \$26.95
Or, \$4.00 cash and 7 monthly payments of \$3.67



MODEL 501

Test your customers' tubes more accurately—all more tubes! That's SUPREME'S new Electro-conductance tube tester. This excellently engineered unit tests tubes for (1) Inter-element leakage between any two elements, (2) open test in any element, (3) short check between any two elements, (4) quality test of complete tube and (5) in the case of tubes having two or more sections, separate sectional quality tests. 5 TESTS ON EVERY TUBE!

Here is value unsurpassed! Trick tubes won't bother you — new tubes won't bother you. If you don't know all about SUPREME'S exclusive "floating filament" tube testing circuit be sure to write today.

Dealer's Net Cash Price \$36.95
Or, \$4.00 cash and 10 monthly payments of \$3.66



MODEL 551

To the serviceman who appreciates the truly time saving ability of SUPREME'S "Free Reference Point" system of analysis, we say "Buy the Model 551 Analyzer!" Use it as a multimeter—or use it as an analyzer! For here you have all the point-to-point functions and ranges of the Model 541 Set Tester PLUS the ability to make all resistance, voltage or current measurements between any two tube elements, or between any tube element and ground or chassis. Why "Get out and get under" the radio chassis?

Instead, using the Model 551, the serviceman literally spreads out the radio receiver's circuit on the analyzer panel, eliminating costly delays in physically breaking each individual circuit for current measurements, or fishing around underneath the chassis for point-to-point tests.

Dealer's Net Cash Price \$38.95
Or, \$4.25 cash and 10 monthly payments of \$3.86

SERVICE

A Monthly Digest of Radio and Allied Maintenance

FOR JULY, 1937

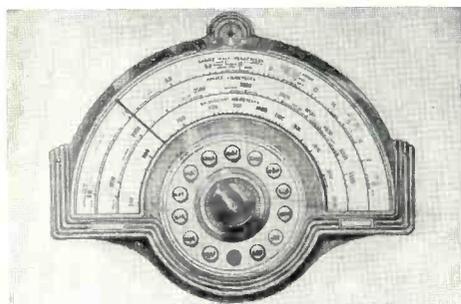
RECEIVER TRENDS FOR 1938

THROUGHOUT THE COUNTRY distributors are offering the 1938 receiver models. In glaring headlines on advertising copy the many remarkable features are commanding attention.

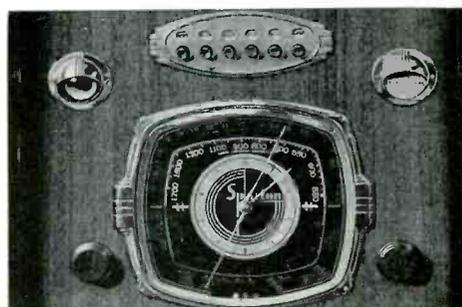
HURRY-UP TUNING

Outstanding among all the new features hurry-up tuning pervades practically every line. The manufacturers,

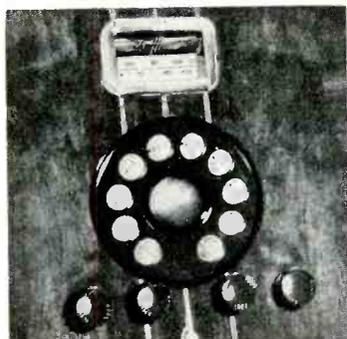
undoubtedly realizing that listeners either through ignorance or laziness do not take time to tune stations accurately, have provided means for so doing simply and easily. The various manufac-



Westinghouse automatic dial.



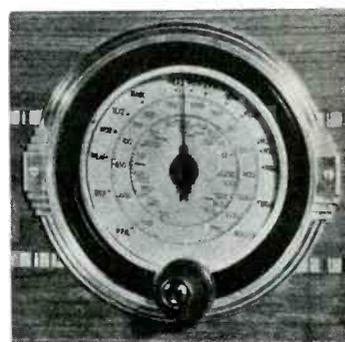
Sparton "Selectronne" device.



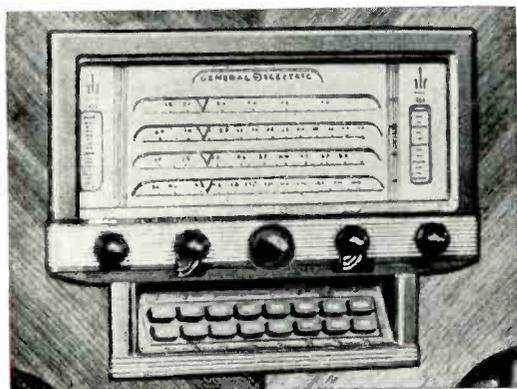
Emerson telephone type dial.



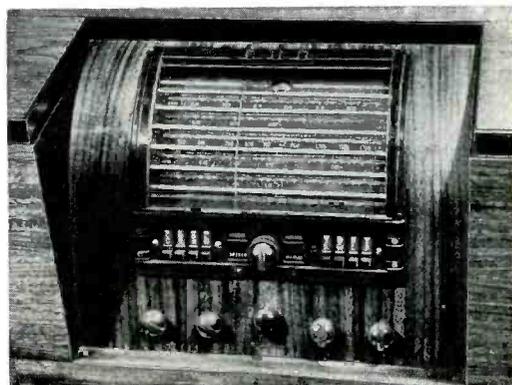
Zenith "Robot" dial.



Philco "Cone-Centric" dial.



Left: G.E. louvre dial and push-button tuning.



Right: RCA electric tuning mechanism.



turers have, however, used several different methods of accomplishing this result.

Some have provided push buttons to control the rotation of a small induction motor which turns the tuning mechanism and gang condenser to the exact setting for a predetermined number of stations. In most of these types afc lends a hand to bring in the station on the nose. In several lines the push buttons are employed, instead, to connect preset condensers across the circuits for accurately tuning a given number of desired stations. Remote push-button control is also available in several of these types.

One (or more) manufacturer has provided a single switch which will cause the dial pointer and tuning condenser to rotate in the direction in which the switch is turned. Releasing the switch causes the pointer to stop. The station may be more accurately tuned, manually, by means of a vernier provided. Practice in manipulating the switch should enable the user to tune the stations accurately without the use of the vernier. In many models afc will help.

Another novel tuning device introduced with the new models employs fifteen concentric cones which center the dial and tuning condensers exactly on desired stations.

As an aid to easy tuning several manufacturers have tilted the front panel or the dial scale eliminating the necessity for "stooping" while selecting a station.

DIALS

The telephone type dial, introduced last season, has been adopted by an additional number of set makers. This dial provides accurate tuning by the simple process of depressing a button and swinging the tuning mechanism around to a fixed stop.

Several of the newer lines feature dial faces which are switched for each band. The listener thus has but one set of station numbers in front of him on any band.

One manufacturer features an edge-lighted louvre dial. The frequency ranges, on this dial, are lettered on the edges of louvres in the dial face. This provides a novel lighting effect for the various bands.

A few manufacturers have added tone and volume control indicators to the dial face. Others have etched knob functions on the cabinet front panel.

In the new models dials have undergone drastic changes and in general have been enlarged. An engineer connected with a large set manufacturer confessed that in this season's models the dial was first designed and then the set was designed around the dial. It would seem from outward signs that this tendency is general in most of the new

models. Tuning has been greatly simplified as a result.

CHASSIS

In addition to improvements in tuning and dials the newer models incorporate circuit changes as well.

A greater number of high-fidelity models are available and in general have come down to a lower price bracket. Automatic frequency control has also been used more extensively.

Degeneration, or inverse feedback, is employed by quite a few manufacturers in many of their models.

The use of metal tubes has increased only slightly and many of the set makers still employ glass or MG types.

Volume expansion, used by several manufacturers last season, and retained, largely, by these, has enjoyed no greater popularity.

Most of the manufacturers have expanded their farm radio lines and are showing improved models; more handsome cabinets, in greater variety; wider range and lower battery drain. With the increasing popularity of wind and power driven battery chargers the six-volt "all-electric" farm radio (using the more recent 0.12-ampere tubes) has come to the forefront. Most distributors are offering special deals on the receivers and charging devices.

Phonograph combinations are available, among the new models, in greater numbers than they were last season.

CABINETS

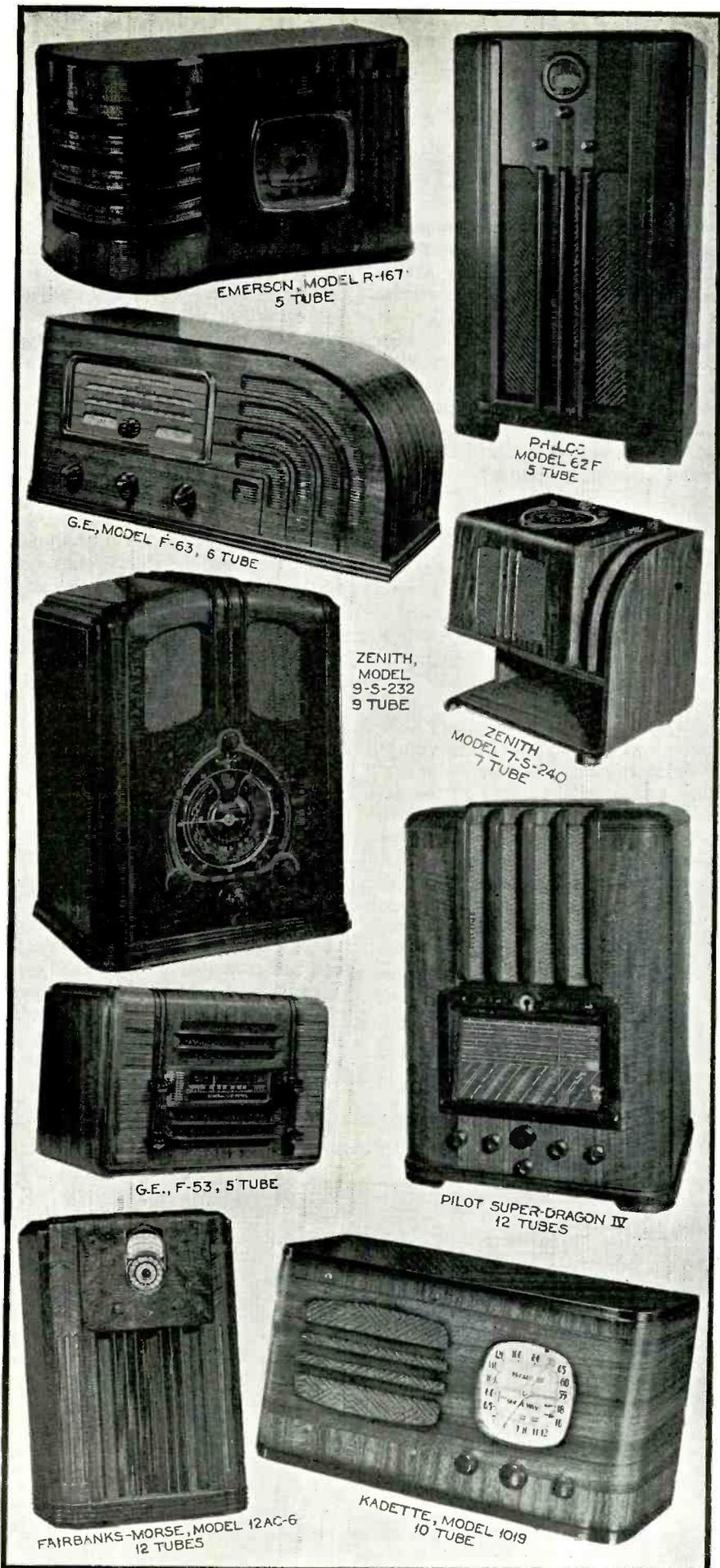
More, new, better and more vividly colored plastics are outstanding among the new cabinet designs. While many manufacturers feature only small personal models with plastic cabinets, several are offering larger mantel and table models in unique moulded designs.

One manufacturer stresses armchair models and provides sixteen different models in as many price ranges. Among these are a combination radio and phonograph model and a bar and radio model.

Another unique innovation among this season's models is the wall cabinet featured by an enterprising manufacturer. The cabinet is very narrow and is designed to be hung on the wall like a picture. A few models are offered to harmonize with appointments in the particular location.

Several manufacturers are using louvres in front of the speaker enclosure to take the place of the speaker grille and grille cloth.

Acoustic considerations are receiving greater emphasis in the new models. In addition to high frequency deflectors, which are present in increasing numbers, many more manufacturers have closed up the back of the speaker compartment and provided proper paths for the rear speaker currents.



A-F CURVE TRACING WITH AN OSCILLOSCOPE*

A METHOD OF OBTAINING the frequency response characteristic of an audio-frequency amplifier is to apply a constant voltage at a number of frequencies to the input of the amplifier under test and to measure the corresponding voltage outputs. The results may be plotted, point by point, on semilog paper. Although the equipment for this method is relatively simple, the process is tedious and time consuming, particularly if the number of frequencies to be investigated is large.

AUTOMATIC RECORDING EQUIPMENT

Automatic recording equipment for tracing the frequency response characteristic of a-f amplifiers is available. The general principle of operation is to feed the output of an a-f oscillator to the input of the amplifier under test; the output of the amplifier operates a stylus which traces the frequency characteristic of the amplifier. The vertical deflection of the stylus may be proportional to the voltage output of the amplifier; the horizontal deflection is proportional to the logarithm of the frequency. In this type of equipment, it is important that the frequency of the oscillator's output voltage be proportional to the logarithm of the angular motion of the dial. In practice, this proportionality is maintained by providing means for calibrating the oscillator at a given point on the dial.

OSCILLOSCOPE AS CURVE TRACER

This article describes a simple, inex-

*RCA application note No. 76. Copyright, 1937, by RCA Mfg. Co., Inc.

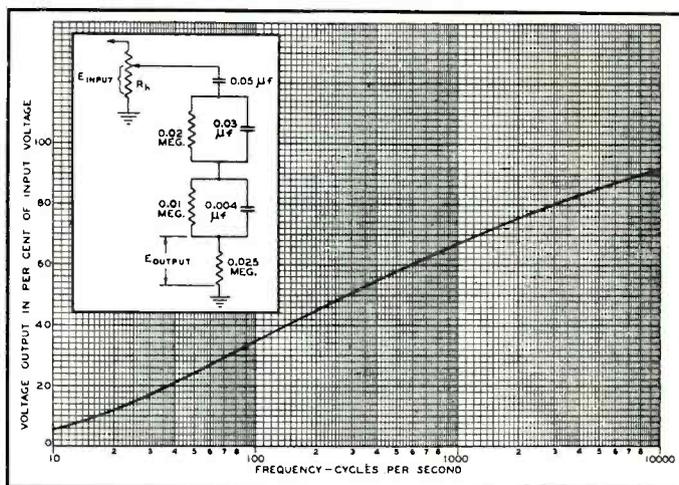


Fig. 2. Frequency characteristic of input network.

pensive means for tracing automatically the frequency response characteristic of an a-f amplifier on the screen of a cathode-ray tube. The only equipment necessary is an a-f oscillator of conventional design, a cathode-ray tube, and a rectifier-amplifier system, shown in Fig. 1.

Referring to the circuit of Fig. 1, it is seen that the output of the a-f oscillator connects to a resistance-capacitance network and to the input of the amplifier under test. The output of the resistance-capacitance network (the voltage across R) is proportional to the output voltage of the oscillator and approximately proportional to the logarithm of the oscillator frequency. Hence, for constant oscillator output voltage, the voltage across R varies only with frequency and is independent of the calibration of the oscillator. The voltage across R is rectified by one section of a 6H6; the rectified output is filtered by $R_1 C_1$ and is applied to the input of a single-stage d-c amplifier. The output of the amplifier furnishes the voltage for the horizontal deflecting plates of the cathode-ray tube. Thus, the d-c voltage applied to these plates is proportional to the logarithm of the frequency.

The signal from the output of the amplifier under test is rectified by the second half of the 6H6; the rectified output is amplified by a 6J7; the d-c output of the 6J7 is applied to the vertical deflecting plates of the cathode-ray tube. The vertical deflection of the spot on the screen is directly proportional to the output voltage of the amplifier under test. To operate the device, it is only

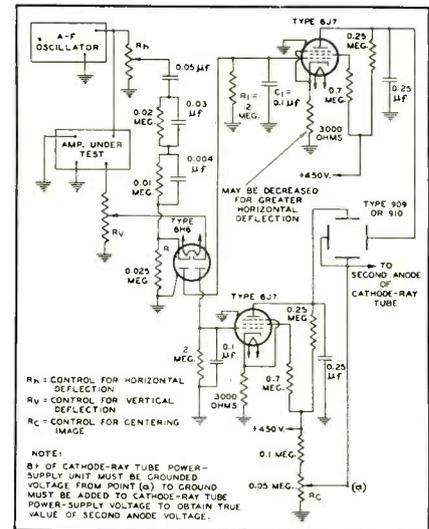


Fig. 1. Circuit of curve tracer.

necessary to turn the oscillator dial through the frequency range of interest for the spot to trace the frequency characteristic of the amplifier.

The action of the resistance-capacitance network is interesting. The values of components were chosen so that a curve of output voltage vs. frequency is a straight line on semilog paper over the frequency range of interest. A measured voltage characteristic of the network is shown in Fig. 2. The characteristic is nearly a straight line from 20 to 10,000 cycles. The curve becomes flat outside this frequency range, a condition which indicates constant deflecting voltage.

A long-persistence screen is used in the cathode-ray tube. This type of screen permits the entire trace to be observed for some time after the actuating signals are removed.

The time constants of the d-c amplifier restrict the time required to make a trace. When the oscillator dial is turned through a desired range too quickly, the trace will not show rapid changes in output due, for example, to resonant conditions in the amplifier. For the values shown in Fig. 1, about 30 seconds is required to make a trace.

TYPICAL RESULTS

The oscillograms in Figs. 3A and 3B show typical results. Fig. 3A shows the effect of disconnecting the voice coil (Continued on page 443)

WHAT IS A SERVICE MAN?

BY A SERVICE MAN'S WIFE

WHAT IS A Service Man? I have often wondered as, with a sigh, I have reheated dishes that had been done to a turn hours before or received a hurried phone call that Al (my beloved spouse) would be detained. More often, I have gone resignedly to bed after receiving no word at all.

In spite of these irregular hours, a Service Man, to begin with, must be efficient after a fashion. On this point I can hear excited murmurs of disagreement from my sister wives and companion sufferers. "How can a man be efficient that tinkers away until late at night when other honest men are at home with their families?" "You call it efficient the way he spends all morning on a two-dollar repair job?"

Calm yourselves. These irritating traits arise from other causes than inefficiency. I maintain that a man must be efficient if he can install six aerials and two auto radios and finish four or five minor repairs as well—a day's average I have seen Al accomplish on more than one occasion. He completed the jobs before supper, too, so that he could spend half the night puttering with an ultra-short-wave set for which the promise of payment was rather vague but probably presented some features of unusual interest.

AN INCURABLE OPTIMIST

A Service Man must be an incurable optimist. No one with his peculiar ability and special training would think of working for the trifling doles which pass



"No knight ever received a summons to Camelot with more delight."

for wages in that trade (beg pardon, profession Al insists on calling it) unless he possessed a high degree of faith in the future.

No one not possessed of an unbounded self-confidence would venture to set up in business on assets which often consist of hardly more than a month's rent or on a collection of stock procured by promising to send a check "as soon as I get back to the shop."

No one not a believer in miracles would accept the promise of payment which can never be more than a pious hope.

PRESENT DAY IDEALIST

One often hears that idealism is a

thing of the past and that in this crass material age only the love for money is a potent driving force. This may very well be so; but anyone who has seen a Service Man turning away from profitable business in order to probe the innermost secrets of an ancient set of dubious value, or heard his "never mind" to a request for a bill by an impecunious radio enthusiast, may well doubt whether profit is the only compelling urge. Even when Al does remember to send a bill after one of these seances I doubt whether he gives the matter adequate thought. He most probably merely jots down some figure so with that out of the way he can continue with his experiments.

But if expectation of gain does not actuate the average Service Man, then what does? What sends the explorer to the icy wastes, the physician to the fever-stricken jungles, the scientist to the dim recesses of his laboratory?

Let some scoff, if they will, at the notion that there is anything in common between the researches of a scientist and the haphazard, intermittent experiments of the Service Man. But anyone who has seen the almost fanatical gleam in Al's eye when he thinks he has made a "discovery" will know what I mean. Was not Sir Isaac Newton the despair of his teachers with his idle investigations into the mystery of falling apples, and such? And Benjamin Franklin probably kept them waiting at home with supper many a night, while he flew kites, and did other childish things. The true spirit of inquiry is not dead. It finds its devotees sometimes in humble



Photo courtesy Dallas Morning News
Texanita, with typically feminine gestures, decides that radio service entails "too many gadgets" for her taste. Scene: NRSA Parts Show, Dallas, Texas.

walks of life. Some there must be who labor, not for reward, but for the very joy of labor.

I console myself with these thoughts, as I wait, a lone vigil, for Al's return, or turn a hem in last year's suit, which must serve for this year, too.

SOME JOYS OF SERVICING

But there are other joys beside that of the work itself. Nobody can ever have so thoroughly a good time as a couple of Service Men getting together in their rare moments of leisure. What do they talk about? Radio, of course! Someone—I forget who—once said that it is only the artist who incessantly talks shop. And your true Service Man is something of an artist, as well as an embryo scientist. Not even artists, discussing their art, can do so with such fervor as a couple of Service Men discussing their common passion—Radio. They can sit up talking all night, and go right to work at it in the morning!

Nor can one dismiss as trivial the opportunity to shine as a minor hero to a wide circle of neighbors. The Service Man is in a fair way to becoming the successor of the baseball champion and the movie star as the object of young America's worshipful regard.

Many a time, I could not get near Al because of the cortege of eager radio hams, who hung upon his lightest utterance, and kept plying him with questions about antennas, automatic tuning or television. And not only youngsters rallied around, but grown men, as well. Something in their naive enthusiasm and rapt looks reminded me of the sporting fans in the cartoons of the late Tad.

But the crowning joy of all is the annual convention of the Institute of Radio Service Men. Al talks of nothing else for weeks preceding and following the convention—who will speak—the topics they will cover—their work in Radio—and general trade talk about the personalities behind the convention.

I make no effort to stop him. For if the gathering of a few Service Men can be the source of such deep-felt satisfaction to the participants, then the gathering of thousands of Service Men, and the opportunity to discourse endlessly upon their beloved topic must be a veritable paradise.

And as I watch Al prepare to leave for the convention, I am convinced that it is. No knight ever received a summons to Camelot with more delight. For a brief space of time, he is going into the magic land of resistors, condensers, transformers, volume controls . . .

An impractical idealist? Perhaps he is. But I wouldn't want him any other way.

THE 6L7 AS A R-F OR I-F AMPLIFIER

(See Front Cover)

THE 6L7 IS A 6.3-VOLT metal-shell tube intended for use as a mixer (first detector) in superheterodyne receivers, although its characteristics enable it to perform other functions. In the circuits shown on the front cover the tube is used as an r-f amplifier. The tube can be used similarly as an i-f amplifier.

TYPE 6L7 TUBE

The 6L7 tube consists of a heater, a cathode, five concentric grids and a plate. Grid No. 1, which is nearest the cathode, is one of two control grids. It is of the remote cut-off type and, because the r-f signal is applied between it and cathode, may be referred to as the signal grid. The remote cut-off characteristic of this grid minimizes r-f distortion and cross-modulation effects when its bias is under the control of the avc system. Grid No. 2 serves the same purpose as the screen in a conventional tetrode; it accelerates the electrons toward the plate and reduces the $G_1 - G_3$ capacitance to a small value (the subscript denotes the grid number). Grid No. 3, interposed between screens G_2 and G_4 , is the second control grid of the tube and has a sharp cut-off characteristic. Grid No. 4 is another screen; it increases the plate resistance

of the tube, reduces the $G_3 - P$ capacitance, and functions similarly to the screen in a conventional tetrode; G_2 and G_4 are connected together internally. Grid No. 5 is a suppressor; it is connected to the cathode internally and serves to limit the effects of secondary emission from the plate; because of the suppressor it is possible to operate the tube at low plate voltages.

CHARACTERISTICS

The table of characteristics recommends, for a given plate voltage of 250 volts, two screen voltages, 100 and 150 volts. Although the space-charge phenomenon is very small in the 6L7, it has been found that electrons repelled by G_3 enter the vicinity of the signal grid and cause a current to flow in that circuit. Where this effect is appreciable, the signal-grid bias must be increased to minus 6 volts to prevent the flow of this current. The screen voltage is raised to 150 volts to compensate for the consequent decrease in conductance. For all-wave receivers, the screen voltage is usually maintained at 150 volts and the minimum signal-grid bias at minus 6 volts.

Courtesy RCA Mfg. Co.

Aladdin I-F Transformer

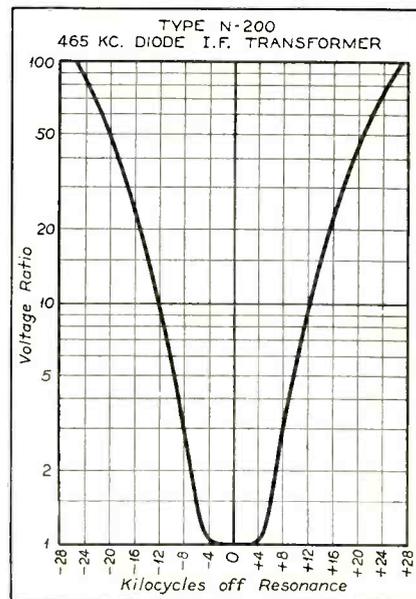
A typical i-f stage using the type N-200, triple-tuned i-f recently developed by Aladdin Radio Industries, Inc., is shown in the accompanying circuit diagram. The compact unit has all three tuning condensers adjustable from the top of the shield can.

Some of the characteristics claimed for the transformer are: a broad flat top (about 8 kc wide) and high adjacent channel rejection (about 30 kc wide, 20 times down). These characteristics

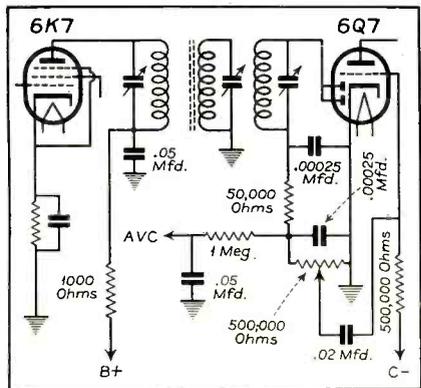
are indicated on the accompanying graph.

Alignment of the three trimmers can be accomplished without the use of a cathode-ray oscilloscope.

Tuning characteristic Aladdin type N-200 i-f transformer.



Circuit showing connections for Aladdin type N-200 i-f transformer.



General Data . . .

Crosley 517, 547 (Fiver)

Crosley receivers employing the Model 517 and 547 chassis are designed for operation from a 60-cycle, a-c source with a power consumption of approximately 40 watts. The tuning range of the receivers is from 540 to 1725 kc and from 6.0 to 15 mc in two

bands. A power output of 2 watts is available.

A circuit diagram of the receiver is given in Fig. 1. The various voltages encountered on the socket prongs are lettered on the diagram. These voltages were measured with a 1000-ohm-per-volt voltmeter with the receiver in operating condition but with no signal

input. Voltages taken in the field may vary 15 percent from the values given. The line voltage was 117.5 volts at the time the measurements were taken.

ALIGNMENT PROCEDURE

The alignment operations for the receiver are given in the accompanying table. The resistor or condenser listed under dummy antenna should be connected in series with the signal generator output lead and the position on the chassis indicated under signal generator connection.

Connect an output meter to P and S of the 6K6G output tube. The meter should be protected from d-c by connecting an 0.1-mfd condenser in series with one of the leads. Always use the lowest signal generator output that will give a reasonable meter reading. The receiver volume control should be on full during the entire alignment procedure.

Allow both the receiver and signal generator to warm up for at least 15 minutes before attempting any adjustments.

Note: If at any time the high-frequency coils in this receiver are replaced it may be necessary to vary the inductance of the oscillator coil by moving the cross-over turn of wire at the gap to make the set track at the 6 mc end. Moving the turn toward the short end of the coil will decrease the in-

ALIGNMENT PROCEDURE

Signal Generator Connection	Dummy	Signal Generator Frequency	Band Switch Position	Dial	Peak Trimmer
I-F ALIGNMENT					
6A8G Grid	0.02 mfd	455 kc	H-F	1,725 kc	Second i-f
6A8G Grid	0.02 mfd	455 kc	H-F	1,725 kc	First i-f
<i>Repeat i-f alignment.</i>					
R-F ALIGNMENT					
Ant post	250 mmfd	1,725 kc	Brdst.	Wide open	BC osc
Ant post	250 mmfd	1,400 kc	Brdst.	140	BC ant
<i>Repeat broadcast oscillator and antenna adjustments as indicated above until no further improvement is obtained.</i>					
Ant post	400 ohms	15,000 kc	H-F	Wide open	H-F osc
Ant post	400 ohms	15,000 kc	H-F	15	H-F ant
<i>Repeat high frequency oscillator and antenna adjustments as indicated above until no further improvement is obtained.</i>					

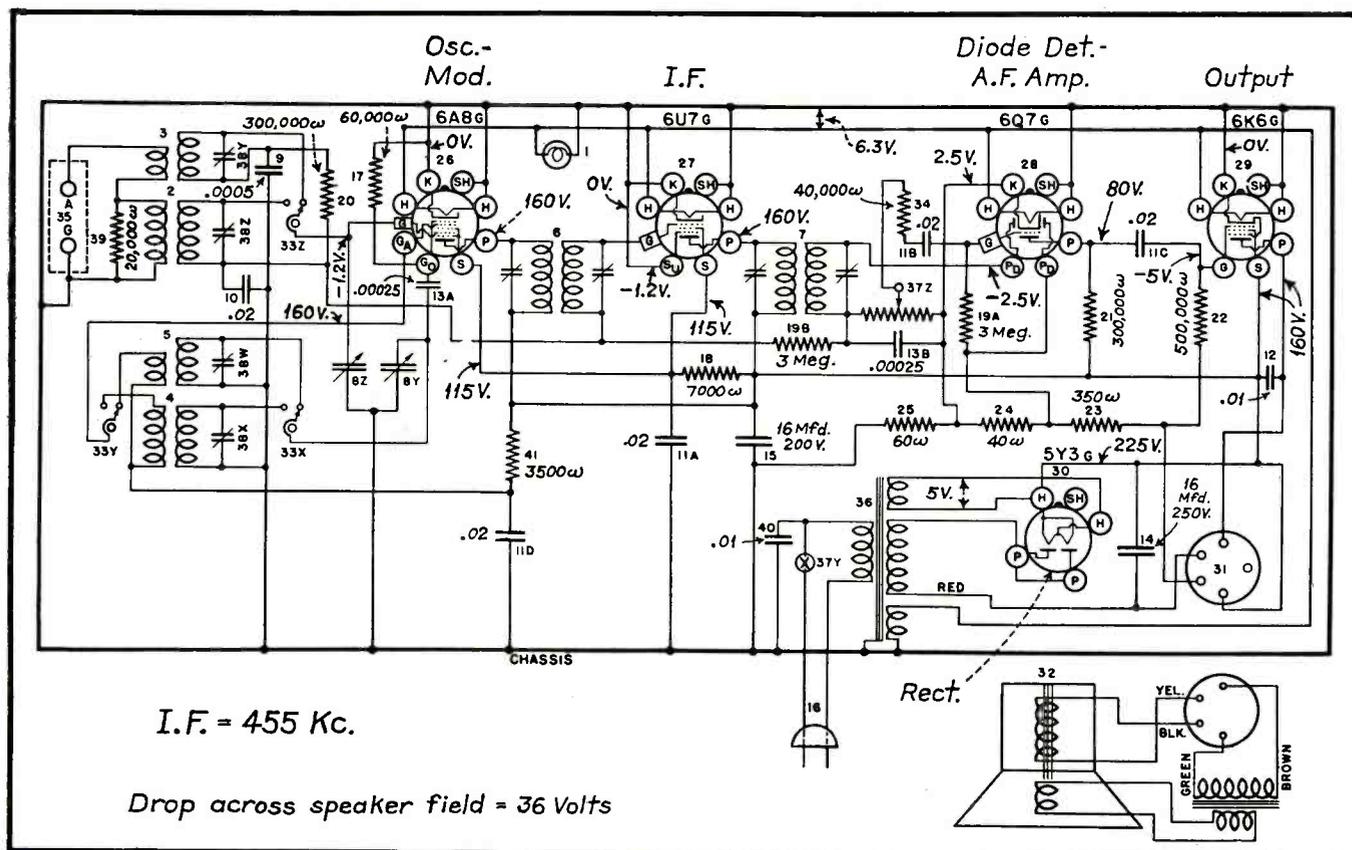


Fig. 1. Crosley 517, 547 (Fiver) circuit diagram.

ductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 mc, a similar slight change in the inductance of the antenna coil should bring up the signal strength.

When aligning the high-frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image. To check this, increase the output of the signal generator about 10 times and try to tune in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kc below the correct frequency. If the circuits have been properly aligned the signal can be tuned in at both positions but much stronger at the correct setting.

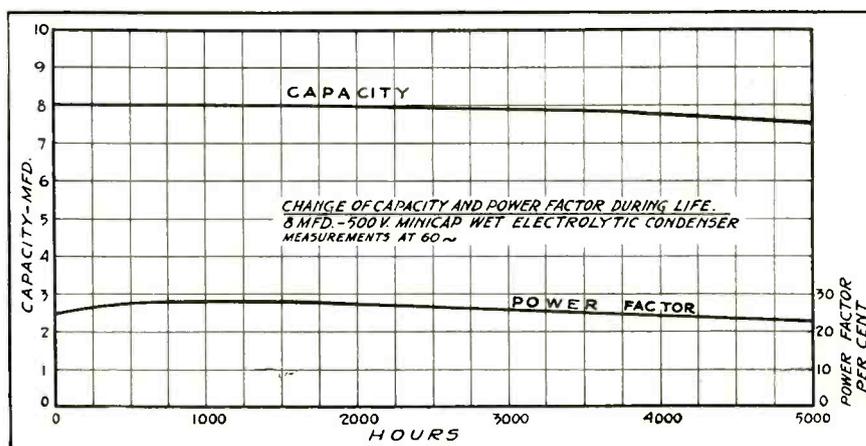
Solar Minicap

The "Minicap" is a compact wet electrolytic capacitor introduced by Solar Manufacturing Corporation. Ranges up to 8 mfd at 500 volts peak and 38 mfd at 100 volts peak are available in a can 1-in. in diameter by 1 15/16-in. high. This represents a reduction in size of about 85 percent from older types of wet electrolytics.

The design of a suitable compact structure was accomplished by an adaptation of the cylindrical fluted type of anode and improved methods of foil etching, it is claimed.

A patented formation process is said to produce a stabilized film on the anode surface which reduces leakage currents. Anodes produced by this process are said to show little deterioration even when the condensers are shelved for as long as one year and that the leakage currents are not excessive when voltage is reapplied at the termination of the

A comparative life test has shown that an 8-mfd, 500-volt peak "Minicap"



Change of capacity and power factor vs. life of Solar Minicap.

condenser performed for over 5000 hours with a diminution in capacity of 0.5 mfd and a reduction in power factor of 1 percent. A standard wet electrolytic on the same test lost 0.3-mfd and had a power factor reduction of 3 percent. Test condensers of both types are still on life test and therefore the ultimate effective life of the "Minicap" has yet to be established. The results of the test are shown in the accompanying graph.

In the freezing chamber the "Minicap" condenser was effective at minus 20 degrees Centigrade (36 degrees below freezing Fahrenheit) as compared to the standard wet electrolytic which normally becomes inoperative at these temperatures. The change of capacity and power factor of a typical 8-mfd "Minicap" unit is given in the accompanying graph.

Stromberg-Carlson 228, 228-H, 228-HB, 228-L, 228-LB

These receivers are six-tube superheterodynes employing metal tubes. There are three tuning ranges which

cover the frequencies from 540 to 3500 kc and from 5900 to 18,000 kc.

A circuit diagram of the receiver is given in Fig. 3, with the tubes used and

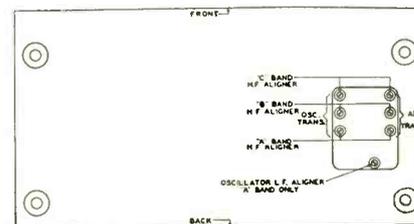


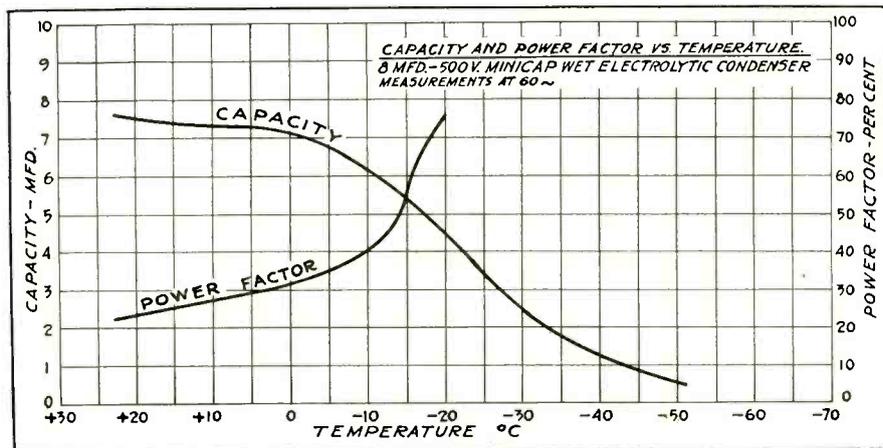
Fig. 2. Stromberg-Carlson 228 r-f trimmer locations.

the various voltages encountered on the socket prongs lettered on the diagram. The voltages are given for a line voltage of 120 volts. A meter having a resistance of 1000-ohms-per-volt should be used for measuring the d-c voltages. The current drain of the receiver is 56 watts.

DIAL ADJUSTMENT

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang condenser. To check whether the dial is correctly set with respect to the gang condenser rotate the station selector knob in a clockwise direction so that the condenser is set to its maximum capacity position (plates fully meshed). The dial pointer should center over the middle vertical line of the three vertical lines located on the glass dial and the vertical lines located on the metal pan of the dial frame.

Rotate the station selector knob so that the dial pointer lines up with the horizontal lines located on the metal pan of the dial frame; with the pointer in this position the two horizontal center marks of the glass dial (located at approximately 9.3 mc on the right hand scale and 2.16 mc on the left hand



Capacity and power factor vs. temperature for Solar Minicap.

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I BUY RAYTHEONS!

*By "CASH"
we mean your
jobber's reg-
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GENERAL DATA—continued

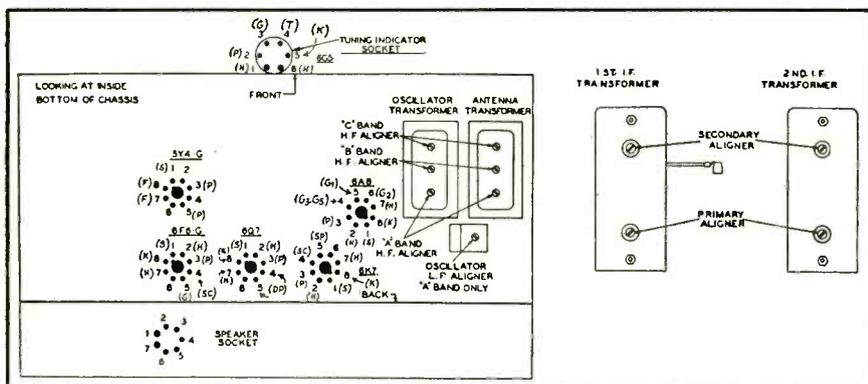


Fig. 1. Stromberg-Carlson 228 tube socket and trimmer locations.

scale) should also be in alignment with the dial pointer. If the above conditions do not obtain loosen the four clamps which hold the glass dial to the dial pan by slightly loosening the four screws, and shift the glass dial so that a good alignment between the dial pointer, the glass dial and the alignment marks on the metal pan of the dial frame is obtained for both the horizontal and vertical position of the dial pointer.

ALIGNMENT PROCEDURE

In making alignment adjustments on these receivers it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the i-f circuits are easily accessible from the rear of the receiver and the r-f trimmers are accessible through the aperture located in the bottom metal base plate of the chassis (see Fig. 2).

A sensitive output meter should be connected across the voice coil or across the primary of the speaker transformer. In making the adjustments the signal

(Continued on page 445)

¹Rock gang condenser during this adjustment.

²Rock gang condenser during this adjustment.

³Rock gang condenser during this adjustment.

Signal Generator Connection	Dummy	Signal Generator Frequency	Band Switch Position	Dial	Peak Trimmer
I-F ALIGNMENT					
6A8 Grid	0.1 mfd	465 kc	Band A	540 kc	Second i-f sec
6A8 Grid	0.1 mfd	465 kc	Band A	540 kc	Second i-f pri
6A8 Grid	0.1 mfd	465 kc	Band A	540 kc	First i-f sec
6A8 Grid	0.1 mfd	465 kc	Band A	540 kc	First i-f pri

Repeat i-f alignment.

Ant post	ohm	mc	Band	Dial	Peak Trimmer
R-F ALIGNMENT					
Ant post	400	17.0	Band C	17.0 mc	C band osc
Ant post	400	17.0	Band C	17.0 mc	C band ant ¹
Ant post	400	3.4	Band B	3.4 mc	B band osc
Ant post	400	3.4	Band B	3.4 mc	B band ant ²
Ant post	200	1.4	Band A	1.4 mc	A band osc
Ant post	200	1.4	Band A	1.4 mc	A band ant
Ant post	200	0.6	Band A	0.6 mc	A band pad ³

Repeat 1.4 mc adjustments.

Repeat the r-f alignment for greater accuracy.

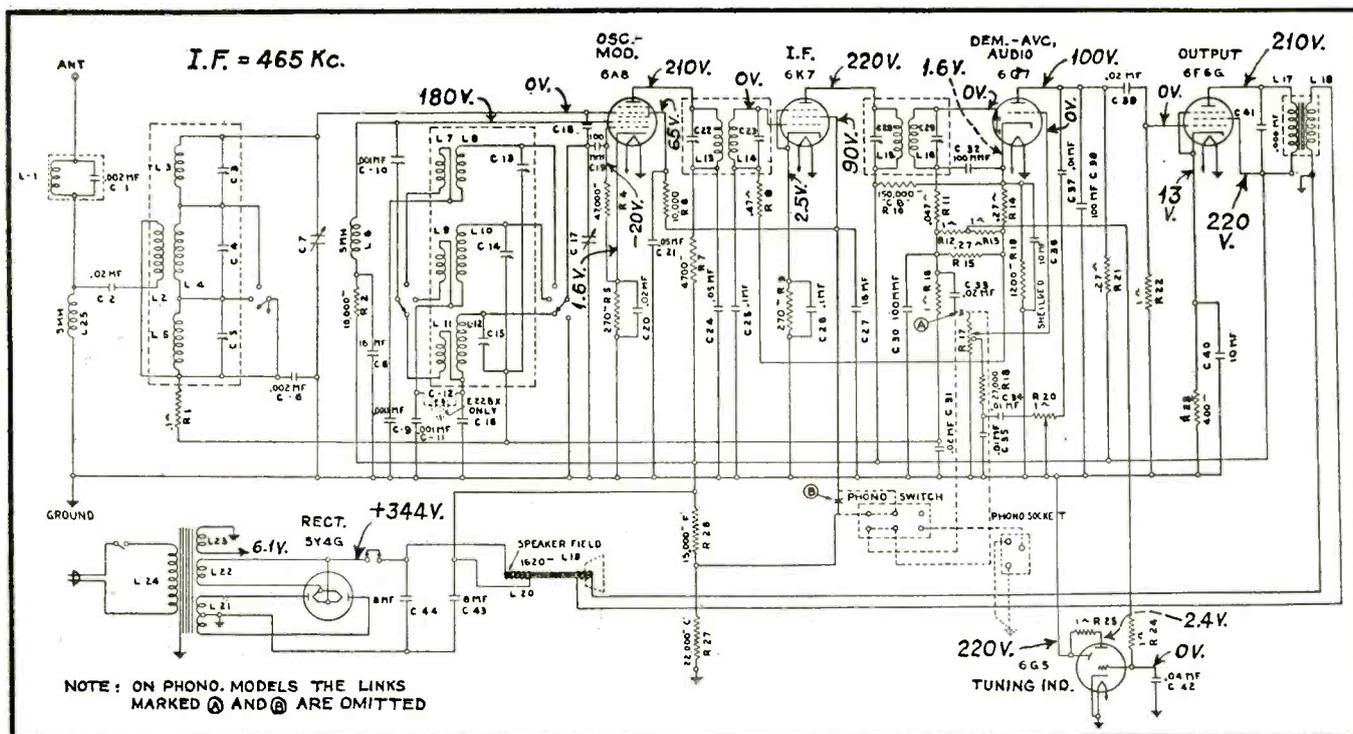


Fig. 3. Stromberg-Carlson 228, 228-H, 228-HB, 228-L, 228-LB circuit diagram.

Auto-Radio . . .

Cadillac-LaSalle 6KB

The Cadillac-LaSalle Model 6KB is a 6-tube automobile radio receiver using metal tubes in a superheterodyne circuit. It covers a frequency range from 528 to 1581 kc. A power output of 5.5 watts is available at the 8-inch dynamic speaker. The selectivity is rated at 42 kc broad at 1000 times the signal and the sensitivity, 2.0 microvolts at 1-watt output. The total current drain is 8.1 amperes at 6.3 volts.

THE CIRCUIT

The signal is fed through an antenna transformer with tuned secondary into a 6K7 tube which functions as an r-f amplifier. A tapped connection is provided in the primary of the antenna transformer for installations in cars in which a high capacity antenna is used.

The output of the r-f tube is fed through another r-f transformer with tuned secondary into a 6J7 tube which functions as the first detector and oscillator. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency 175 kc above the frequency to which the r-f circuits are tuned.

One stage of i-f amplification is employed using a 6K7 tube. The primary

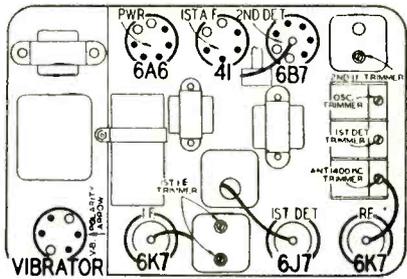


Fig. 2. Parts layout and trimmer locations.

and secondary of the first i-f transformer and the primary of the second i-f transformer are tuned by small trimmer condensers.

A local-distance switch is used to reduce the sensitivity for city driving. When the switch is in the local position, resistor R15 is in series with r-f and i-f bias resistor R8, causing a reduction in sensitivity. When the switch is in the distance position, resistor R15 is short circuited and full sensitivity is obtained.

A 6B7 duo-diode-pentode tube functions as a diode second detector, avc tube and a one stage audio amplifier. Avc voltage is applied to the control grid circuits of the 6K7 r-f and i-f tubes. The manual volume control

varies the audio voltage applied to the grid of the 6B7 tube.

Resistance coupling is used between the first audio stage and the second audio stage which employs a 41 tube. The latter is transformer coupled to the output stage which uses a 6A6 tube. This tube is a Class B power amplifier and combines two triodes in one envelope. A dynamic reproducer is employed.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

Polarity in inserting the vibrator must be observed. It can be inserted in two ways, and the correct method depends on which terminal of the car storage battery is grounded.

A circuit diagram of the receiver is shown in Fig. 1 with the various voltages encountered on the socket prongs lettered on the diagram. These voltages were measured with a 1000-ohm-per-volt voltmeter with the antenna plug withdrawn, the local-distance switch in the distance position and with a battery voltage of 6.3 volts at the battery under full load.

I-F ALIGNMENT

Connect the output of the signal generator through an 0.05-mfd condenser to the stator of the first detector section of the tuning condenser. See Fig. 2 for the location of this section.

Connect the ground lead of the gen-

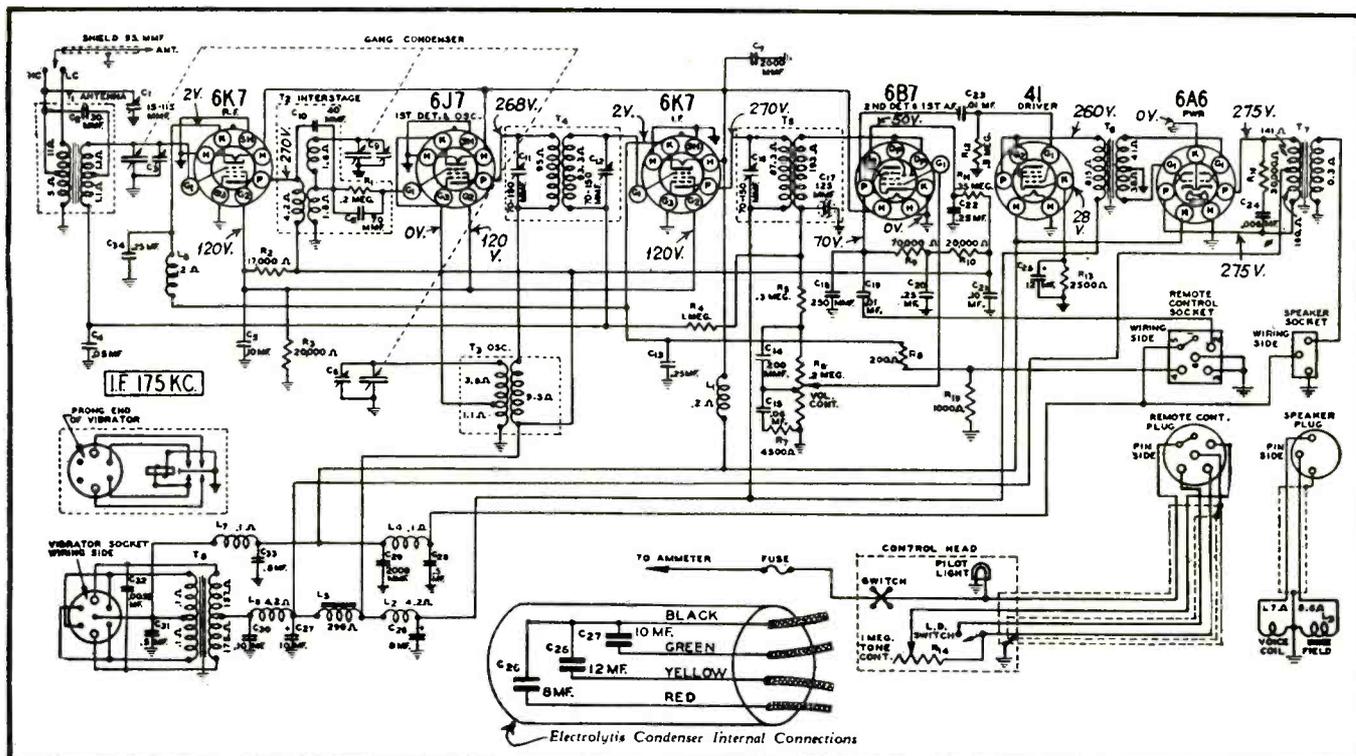


Fig. 1. Cadillac-LaSalle 6KB circuit diagram.

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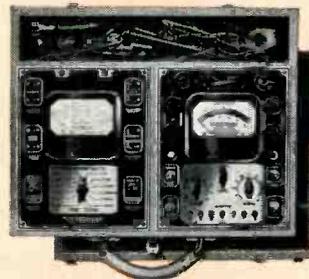
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erator to the receiver chassis. The chassis should be in its case. Turn the local-distance switch to the distance position and keep it in this position for all adjustments. Set the volume control at maximum position. Turn on the receiver and signal generator and allow both at least 15 minutes to warm up before attempting any adjustments.

Set the signal generator for a signal of 175 kc. Attenuate the signal from the generator to prevent the leveling-off action of the receiver's avc.

Adjust the three i-f trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2. Repeat the i-f adjustments for greater accuracy.

R-F ALIGNMENT

1581-kc alignment: Set the signal generator for 1581 kc.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug for a high capacity antenna (mark on LC side). Connect the shielded antenna lead from the chassis through a 120-mmfd condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent avc action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. See Fig. 2 for location of this trimmer.

1400 kc adjustment: Set the signal generator for 1400 kc.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the first-detector and antenna 1400 kc trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

600 kc adjustment: Set the signal generator for 600 kc.

Turn the tuning condenser rotor until maximum output is obtained.

Adjust the antenna 600 kc trimmer to maximum. This trimmer is reached from the outside of the case (see Fig. 3).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted for a low capacity antenna (mark on HC side) if a low

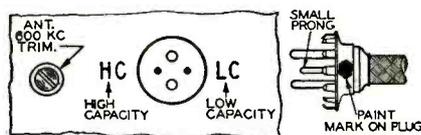


Fig. 3. Antenna plug insertion.

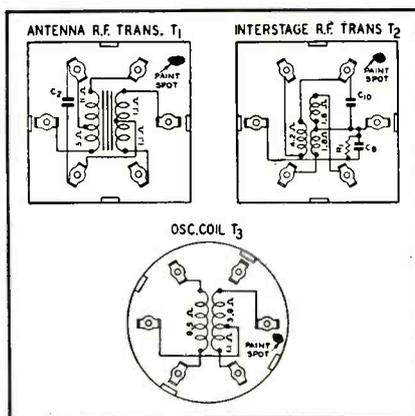


Fig. 4. R-f and oscillator coil base terminal arrangement and resistance of windings.

capacity car antenna is used.

ANTENNA ADJUSTMENT

After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna 600 kc trimmer.

Tune in a weak signal at approximately 600 kc with the volume control at about three-fourths of its complete rotation. Turn the adjusting screw of the antenna 600 kc trimmer up or down

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See notice on page 427 for additional details.

until maximum output is obtained. See Fig. 3 for location of this trimmer.

CALIBRATING THE DIAL

Tune in a signal of known frequency at about the center of the dial. Choose a station with a frequency which corresponds to one of the numbers on the dial drum. For example, WLW, with a frequency of 700 kc, corresponds to 70 on the dial.

Hold the tuning knob. Using a clean eraser on the end of a lead pencil, turn the dial drum until the frequency of the station tuned in is at the center of the dial opening.

ANTENNA PLUG

The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna

and shielded lead is approximately 200 mmfd, which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug for a high capacity antenna or with the mark on the LC side.

If the total capacity of the antenna and shielded lead is approximately 70 mmfd, such as may be the case if a fish pole antenna is used, insert the antenna plug for a low capacity antenna or with the mark on the HC side.

June Issue Corrections

In an effort to rush the June issue to press in time for the Chicago Trade Show several errors escaped our attention.

In the article on graphs, page 333, the equation on Fig. 2 should read

$$2A + 3B = 25,$$

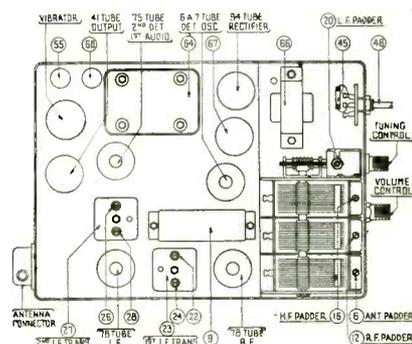
as indicated in the text on the next page.

On page 334, in the same article, the coordinates of Fig. 3 are improperly indexed, i. e.: the vertical column of numbers to the left of the figure should be B, and the horizontal column A.

On page 335, in the third column to the right, 22 lines from the top, the grid bias should be -8 (instead of -13). This is correctly marked on Fig. 7.

On page 340, in the continuation of the article on matching transformers, mention is made of a 125-500 ohm-to-grid transformer. A 125-500-ohm winding consists of a 500-ohm winding, center-tapped. The difference between either end and the tap is 125 ohms. This is clearly explained by the text of the same article.

In Fig. 1, of the article on the zero-current voltmeter, on page 370, an additional condenser should be connected from the junction of the resistors R₃, R₄, R₅, and R₆ to the chassis. This is the condenser C₁ referred to in the text as having some control over the lag of the avc voltage.



Parts layout and trimmer location for Ford-Philco F-1440 featured in the June issue. Due to an error in makeup the wrong layout was given.

Public Address . . .

Intercommunicating Systems

Because of the individuality of each installation the Service Man is especially adapted to the job of selling as well as installing intercommunicating systems. The purchaser usually hasn't the technical ability necessary to specify exactly what he expects from the system—he explains the use to which it will be put but it is up to the salesman to know just what equipment is necessary and how it will be connected. One small misunderstanding and the profits are wiped out and customer satisfaction lost.

"These new fangled efficiency systems never did work, no how," is an expression too easily applied and repeated. More than one sale has been killed because of this.

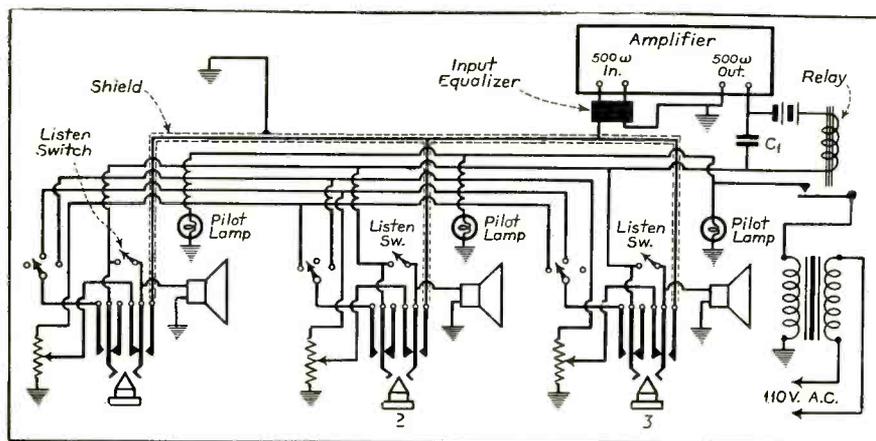
In a highly competitive business of this nature it is definitely to the salesman's advantage to know the flexibility of each system and the amount of labor required for its installation. In selling these systems the Service Man can, through tactful suggestions, recommend suitable additions which will not only mean more profits but will bring greater appreciation for the installation because of its wider application. In other cases, where price is a factor, a negligible change in the requirements might enable the use of a less expensive type.

EACH INSTALLATION INDIVIDUAL

The exact type and connections required for a particular system vary with each job. In a previous article¹ on the subject the classification under which the general types fall were dis-

¹Intercommunicating Systems, SERVICE, April 1937, p. 209.

Fig. 2. Selective system using one amplifier.



equipment. This fact is realized more readily as the individuality of each job is appreciated and is clearly demonstrated by investigation of the accompanying diagrams.

Even in the simplest installation, where communication is required between two points, a variety of types may be used depending upon wiring possibilities, price and probability of future expansion. As the requirements grow more complex their individuality is more pronounced.

In most of the intercommunicating systems now on the market a common device is used both as a speaker and as a microphone. A switching system is so arranged that this microphone-speaker device is normally connected to the output of the amplifier ready for use as a speaker. This corresponds to the "listen" position of the switching arrangement. On operating the switch to the "talk" position the device is connected to the input of the amplifier for use as a microphone.

This microphone-speaker device may originally have been designed for use as a speaker or as a dynamic microphone. Where the device is essentially a speaker an equalizer may be used in the microphone circuit (see Fig. 1).

The equalizer consists of a high pass filter with the constants so arranged as to attenuate the low frequency output of the speaker to a proper working level when it is employed as a micro-

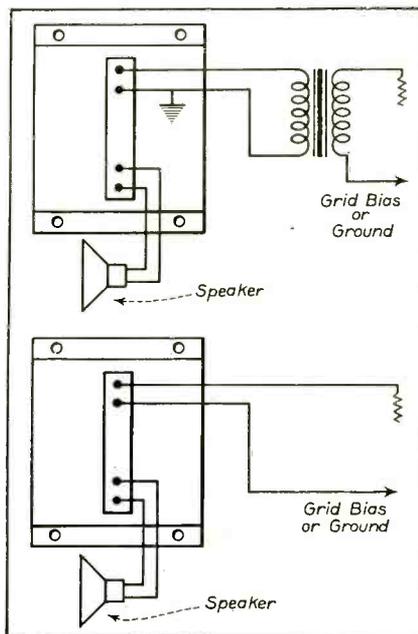
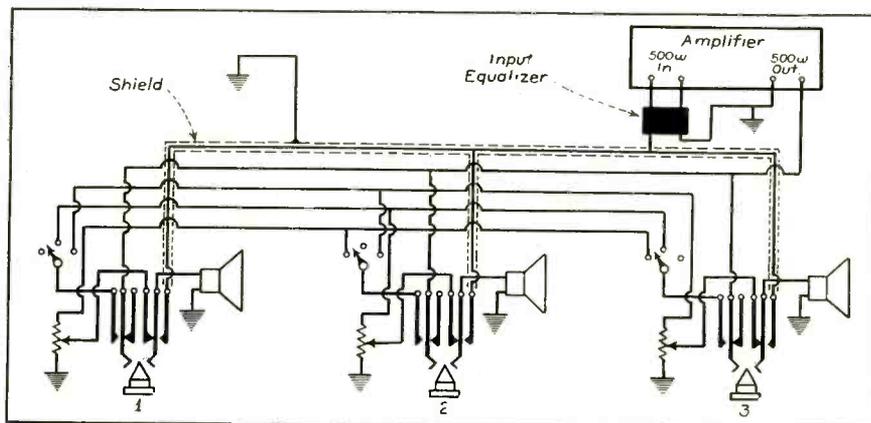


Fig. 1. Input equalizer connections.

phoned without describing the actual connections for any given type.

The flexibility of a system depends largely upon the ingenuity of the installation rather than the technology of the



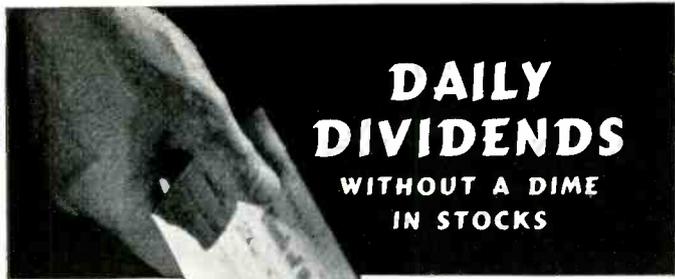
phone. The use of equalizers is desirable where high quality pickup is required.

Fig. 1 shows the proper connection for use with a 500-ohm transformer input or direct to the grid of the amplifier. Equalizers are available for either application.

SELECTIVE SYSTEM WITH SINGLE AMPLIFIER

An inexpensive selective system which may be used for many installations is shown in Fig. 2. A selector

Fig. 3. Selective system with busy signal.



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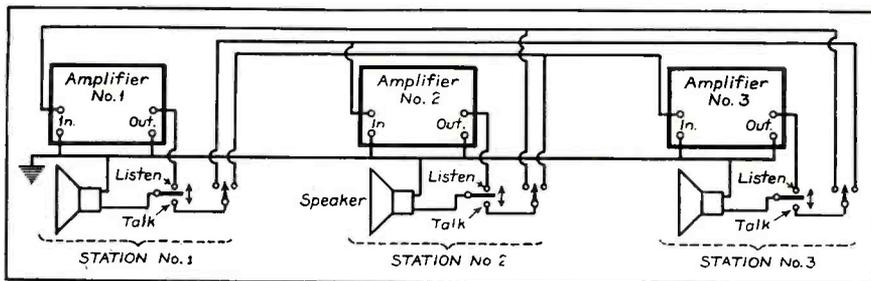


Fig. 4. Multiple selective system with amplifier for each position, inputs switched.

switch, volume control, talk-listen switch and speaker-microphone is provided at each position. Any number of similar positions may be added but for each addition another tap on the selector switch must be provided. A single amplifier is used for the entire system.

With the connections indicated any station can call and hold conversation with any other station on the system (barring the simultaneous operation of talk-listen switches) regardless of the position of the selector switch on the called station.

An equalizer is shown connected to the input of the amplifier. Since only one amplifier is used a single equalizer is also sufficient.

The line lead is shielded to prevent feedback from the output leads. The remaining leads can be run together as a single multiple wire cable. The talk-listen switches are of the anti-capacity type. The volume control is connected in the output or speaker circuit and may be adjusted to suit the requirements at each position.

The chief drawback preventing universal use of the connection shown in Fig. 2 is that only one conversation at a time may be held over the entire system. Additional difficulties may arise even in installations where the system would suffice because of the possibility of other positions breaking-in on the conversation.

To offset this a busy indicator, connected as shown in Fig. 3, is used. A relay whose circuit is completed by the operation of any talk-listen switch closes the supply line for the busy signals which light-up at every position.

In the circuit, as shown in Fig. 3, a listen switch is also provided which enables any position to connect his speaker to the output of the amplifier and listen-in on any conversation. These switches may be omitted or included as required.

MULTIPLE-SELECTIVE SYSTEMS

In Figs. 4 and 5 the general connections of several two way, multiple selec-

tive systems, using amplifiers at each position, are shown. Here again additional stations may be added, requiring another tap on each selector switch as well as the equipment indicated for each position shown in the figures.

In the system shown in Fig. 4 the

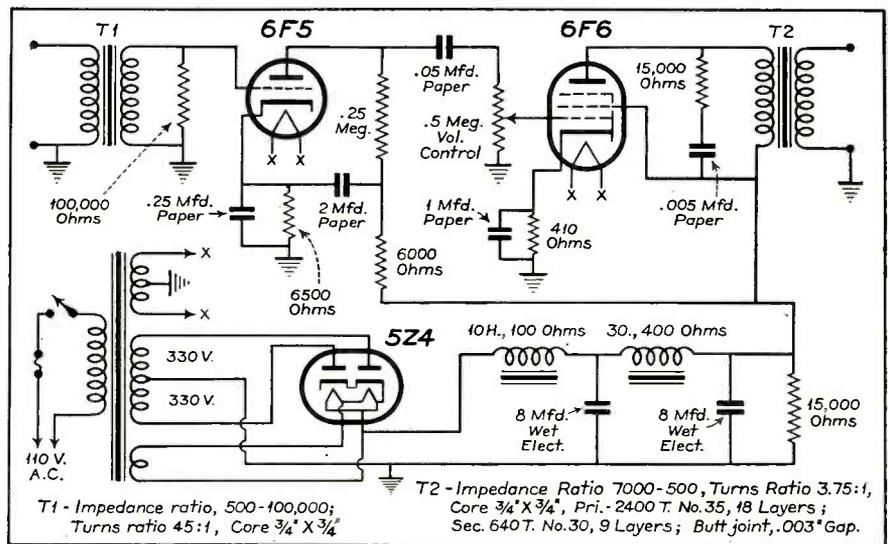


Fig. 6. Typical a-c amplifier for intercommunicating systems.

input to the amplifiers is switched. By using this method all the amplifiers must be on to make the system operative. However, by switching the outputs as indicated in Fig. 5, it is only necessary for any station to have its own amplifier on in order to call any other station.

In either case, however, as many

separate conversations can be held as there are pairs of stations.

Additional flexibility can be obtained with the system shown in Fig. 5. Any desired position can be used as the master station and a number of remote speakers can be connected to it. Similarly one or more announcing or call positions can be connected to any station. Power boosters may be used where necessary.

Systems of this latter type present solutions to practically every conceivable intercommunicating problem.

THE AMPLIFIER

The circuit diagram of a typical intercommunication system amplifier is shown in Fig. 6. Three tubes are used, a 6F5, a 6F6 and a 5Z4. The

amplifier is of the low gain type designed for operation with a speaker-microphone having a 500-ohm line transformer having a 500-ohm line transformer incorporated. The input transformer (T1) has an impedance ratio of 500 to 100,000; turns ratio 45 to 1 and a 3/4 inch (square) core. A 100,000-ohm resistor is used to load the secondary which feeds the 6F5 tube.

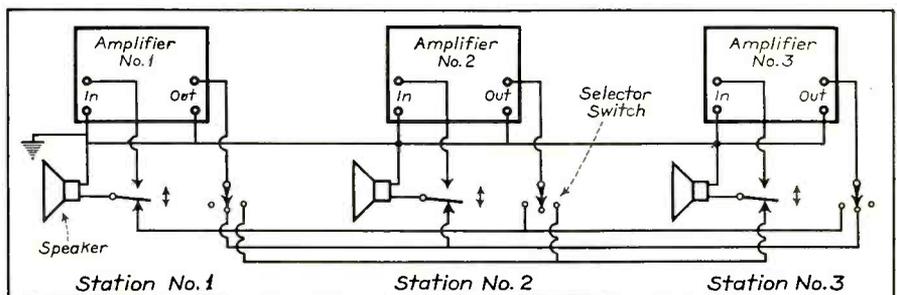


Fig. 5. Multiple selective system with amplifier for each position, outputs switched.

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2. We have been compelled to adopt this policy in order to protect our subscribers against unauthorized persons, who have in some cases imposed upon prospective subscribers.

3. After August 1, 1937, no one is authorized to solicit subscriptions or collect money for subscriptions to SERVICE.

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The output transformer (T2) has an impedance ratio of 7,000 to 500, a turn ratio of 3.75 to 1 and a 3/4-inch (square) core. In winding the transformer coils a No. 30 wire was used; 9 layers of winding were necessary. A butt joint core is used with a 0.003-inch gap.

In the plate supply circuit choke input is used. The inductance of the first or input choke is 10 henrys and it has a d-c resistance of 100 ohms. The second choke has an inductance of 30 henrys and a d-c resistance of 400 ohms. A 15,000-ohm bleeder resistor is used to load the plate supply circuit. Two wet electrolytic condensers (8 mfd each) are ample to provide smooth d-c to the tube circuits.

The amplifier described is for operation from the 60-cycle, a-c power line. Many of the systems now on the market employ similar amplifiers for operation on the 110-volt a-c or d-c lines.

Circuit diagrams, courtesy Wright DeCoster, Inc.

Public Address Markets

When we stop to consider that in its simplest form a sound system is the means by which one person can communicate announcements, sales story, entertainment or instructions to more people than he could possibly address or communicate with unaided, we begin to visualize the vast, untouched market for this equipment. When we realize that sound equipment gives its user a direct appeal to the ears of everyone within range of his amplified voice, and as we begin to interpret the applications for sound equipment in terms of every place and occasion where a group of people gathers, whether for buying or for working or for playing, we then visualize the beginning of this tremendous field.

We are all accustomed to the uses of sound equipment in places of amusement, such as ball parks and athletic fields where great crowds gather and where the event is greatly enhanced by an audible description over the sound system. So far, however, the industry has failed to convey to the general pub-

lic how equally enjoyable and essential this equipment can be for practical every-day applications.

Local Service Men have a wonderful opportunity before them to popularize this equipment. They can apply it to the operation of any medium size store or market for the direction of visitors when store traffic is heavy, for permitting the occasional solicitation of business within the store by pointing out unusual values and buying opportunities. In larger mercantile establishments, this service to the customer can be augmented by using the equipment to put the store management in close and immediate touch with the store personnel. Few, if any, business establishments have auditoriums or halls within which they can readily assemble all of their employees, yet a centralized sound distribution system puts them in instant communication with every member of their personnel.

In my judgment, an even greater field exists at the moment in industry. It has now become not merely desirable, but absolutely essential, that managements have the means of communicating audibly with every employee. This, I believe, the most fertile immediate field for the local Service Man. Obviously, it is impractical to take men from their work in order that they may hear the views of their employers, especially when a plant sound distribution system provides this service instantly and without undue interruption of the daily working schedule.

In addition, industrial sound distribution systems are a profitable, permanent investment. With these systems, hundreds of hours of time annually in any industrial plant and a corresponding saving in dollars and cents can be effected by enabling the switchboard operator to locate executives and others regardless of where they may be in the plant and informing them, rather than merely signalling them by lights or horns.

I am using the mercantile and industrial applications only as two examples. The use of sound equipment in other businesses presents equally attractive opportunities. With this equipment, sales may be stimulated, service increased, time saved, employees' morale maintained, leisure hour recreation purveyed, and numerous other attractive and profitable daily uses made of the system.

The local Service Man will profit most who combines energetic selling with conservative claims for his equipment. Because the uses of the equipment are just now filtering to the public

mind, the local community will rely upon its Service Man for dependable service and accurate information. If he exercises care in selling, but not overselling, he will soon establish himself as the local source for dependable merchandise.

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TEST EQUIPMENT—continued

ated gain controls are provided for facilitating comparative tests. The sensitivity of the horizontal amplifier is approximately 0.8 peak volts, and the sensitivity of the vertical amplifier is approximately 0.7 peak volt-per-inch deflection. Metal tubes are used in the amplifier circuits, and separate ground pinjacks are provided for each amplifier.

Means are incorporated for external and internal synchronization of the input potential under study with the (sawtooth) linear time base in addition to provisions for synchronization of the linear time base with the local power supply frequency. Intensity and focus controls are provided.

The Model 535 can be used for either single or double image alignment. When used with a good signal generator which includes a frequency-modulation circuit the oscilloscope may be used for setting up resonance curves for visual adjustments, of i-f amplifiers. Complete checks may be made for alignment of tuned circuits by either the single or double image methods. Selectivity and sensitivity can be determined, and sources of hum trouble may be located which are otherwise difficult to find.

An adjustable tubular hood which can be used as a light shield is included.

MODEL 530

The Supreme Model 530 cathode-ray oscilloscope is a 3-tube model which also uses a 2-in cathode-ray tube, one anode supply rectifier and one type 6J7 octal tube for the vertical amplifier circuit. When the Model 530 is used in conjunction with a separate device which will supply the required sweep circuit voltages it will perform practically as many functions as the 535.

External sweep voltages may be applied to the horizontal deflecting plates and here, too, a gain control is provided to limit to a usable value potentials applied to the horizontal plates.

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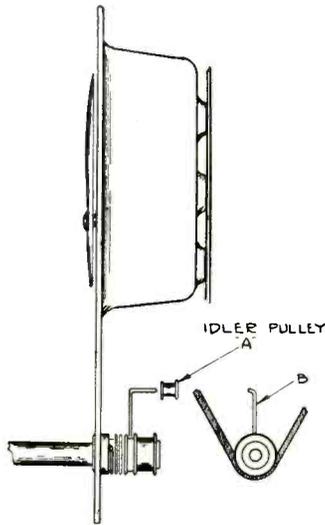
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RECEIVER CASE HISTORIES



Figs. 1 and 2. Side and front views of the original belt take-up assembly for Belmont Models 686B, 786 and 822 showing the idler pulley and spring.

Belmont 440

Replacing pilot lights: In order to replace pilot lights in this model it is necessary to remove the chassis from the cabinet. These lamps are connected in series, if one of them burns out the other one will not light. They are 6-8 volt, 0.15-ampere lamps.

Belmont 685, 686, 786, 787, 778, 878, 879, 1170, 1171, 1172

Dial drive slippage: The drive belt take-up assembly originally built into the dial mechanism of these model receivers is ordinarily adequate to compensate for normal stretching and wear of the belt. In certain cases, however, slipping has been reported and a new

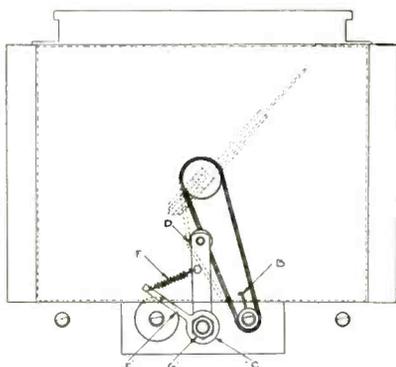


Fig. 6. Front view of Models 778, 878, 1170 and 1172 dial mechanism.

type belt take-up assembly is available.

Recent production of these models have included the newer type assembly as an original installation, it is therefore necessary that it be installed only on receivers where a tendency toward slippage is observed.

Several views of the dial assembly used on the Belmont models 686C, 786 and 822 are shown in Figs. 1 to 4 inclusive. To install the newer type belt take-up assembly on these models slip the drive belt off belt take-up idler pul-

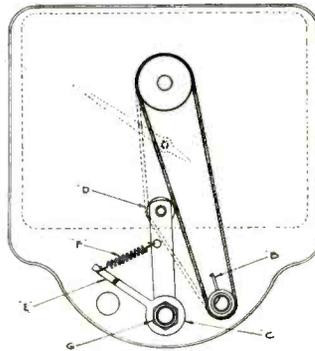
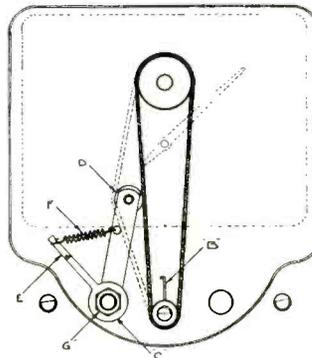


Fig. 3. Front view of Models 686B, 786 and 822 dial mechanism showing newer type of take-up assembly in place.

Fig. 5. Front view of Models 685 and 686A dial mechanism.



ley A (Fig. 1). Leave the old take-up spring in position B (see Fig. 2).

Remove the nut G (see Fig. 3) from the new belt take-up assembly and mount the assembly behind the dial plate through hole C (see Fig. 3). Slip the drive belt over the pulley D. The new position of the belt is shown in dotted lines in Fig. 3.

It is important in these models that the spring lever arm E is installed so that it is between the band change indicator disc H (see Fig. 4) and the dial plate.

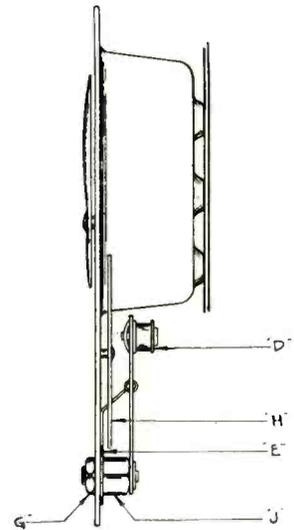


Fig. 4. Side view of Models 686B, 786 and 822 dial mechanism with newer type take-up assembly in place.

The nut G has a shoulder which is used to center the new take-up assembly in the hole C.

The spring lever E should be adjusted to put the proper tension on the spring F and the belt.

Hold the spring lever E and the bushing J in place and tighten the nut G. (See Figs. 3 and 4.)

The belt take-up assemblies for the models 685, 686A (see Fig. 5); the 778, 878, 1170, 1172 (see Fig. 6) and the 787, 879, 1171 (see Fig. 7) are installed in a similar manner using the special newer type take-up assembly prescribed for each series.

Note: Some model 787 dial drives were equipped with a wide red belt. In these cases this type belt will still give trouble even with the newer type belt take-up assembly. It is advisable to replace the belt with a newer two-ply type.

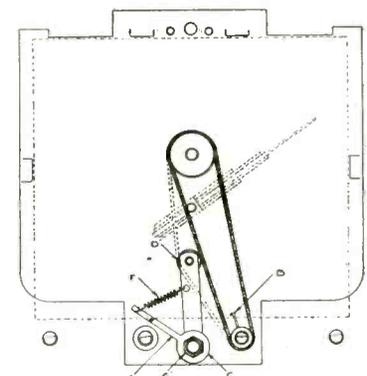


Fig. 7. Front view of Models 787, 879 and 1171 dial mechanism.

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with Model 1670

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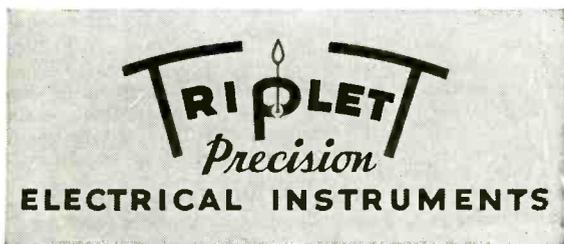
This new Triplett Vibrator Tester has been constructed with the engineering cooperation of leading manufacturers of vibrators. It will test all types and makes. A load of 5000 ohms recommended by the vibrator engineers is applied. The 3-scale meter shows the following: 0-10 volt scale shows voltage input to the vibrator; the GOOD-BAD scale shows output; scale marked 0-100 per cent shows per cent of output voltage as reflected by change in input voltage. Low damped meter permits needle to follow voltage fluctuations caused by faulty vibrator contacts.

Model 1670 in Portable Metal Case with Black Wrinkle Finish. Attractive Etched Panel. DEALER NET. . . . \$24.00

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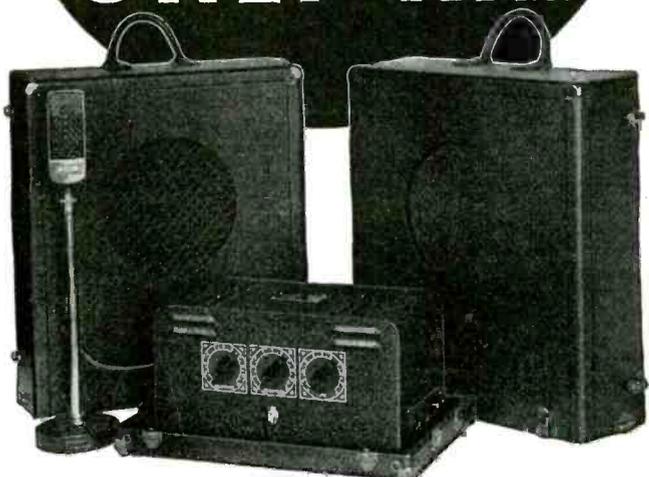


TRIPLETT ELECTRICAL INSTRUMENT CO.
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Please send me more information on Model 1670;
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2 Heavy Duty Speakers . . . Veletron Microphone
 with Banquet Stand . . . electronically mixes two
 microphones and phonograph . . . all coming
 complete in a three piece SINGLE carrying case
 . . . compact, easy to carry . . . beautiful.



Model 124-W
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 you can obtain anywhere at SO
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ASSOCIATION NEWS . . .

INSTITUTE OF RADIO SERVICE MEN REPORTS

THE IRSM AT ITS regular annual meeting held at the Hotel Stevens, Chicago, June 12, elected as national officers: J. M. Rathsburg of Detroit, Michigan, president; F. L. Hornman of Brooklyn, New York, vice-president and Joe Marty, Jr. of Wilmette, Illinois, secretary-treasurer. All of the newly elected officers are practicing "Radioneers."

The officers were installed the same night at the official opening of the Fifth Annual National Convention of the IRSM, John T. Rose, retiring president, presiding.

President Rathsburg, in his inauguration address, stated his belief in the principles and purposes of the Institute of Radio Service Men and pledged himself to serve its members.

"The Institute has long pledged itself to full cooperation with the other branches of the industry," said Mr. Rathsburg. "We feel as Service Men that we are a vital and necessary part of the industry—a connecting link between the producer and the consumer."

"I am confident that the future of the Institute is assured and that we can look forward to a continued and increased success."

Biographical accounts of the newly elected officers follow:

John M. Rathsburg, president: Born in Detroit, Michigan, April 25, 1905. Married, three children, home in Detroit. Educated in Detroit grade and high schools and the University of Detroit. Interested in radio as a hobby since high school days. Entered the radio field professionally in 1928 as a Service Man. 1930: became Service Manager for one of the larger dealers in Detroit. Founded own business, specializing in service and antenna work, in 1932, continuing to date. Member of the Institute of Radio Service Men since 1933. Chairman Detroit Chapter 1933, -4, -5, -6. Elected to the Board of Trustees 1935.

Frederick L. Hornman, vice-president: Born in New York City, December 22, 1902. Married, five children, home in Brooklyn, N. Y. Educated New York public and high schools, extension courses Columbia University and Massachusetts Institute of Technology. Four years Sales and Service Manager of one of large New York radio chain stores. Instructor in charge of Radio Service, RCA Institutes, New York, for last nine years. Is actively engaged in p-a, receiver, and test instrument installation and repair. Member of IRSM since 1932. Chairman New York Chapter 1935. Organizer and first chairman New York Metropolitan Chapter of IRSM. Chairman Technical Papers Committee New York Chapter and directed New York IRSM Convention program for three years. Elected to Board of Trustees 1936.

Joe Marty, Jr., secretary-treasurer and acting executive secretary: Born in Union City, Tennessee, June 10, 1902. Married, two children, home in Evanston, Illinois. Education: grade and high school, EE at Northwestern University. Engaged actively in radio service 1927 to date. Owner of Wilmette Music and Radio Shop, Wilmette, Illinois since 1933. Charter member

of Chicago Chapter IRSM. Chairman Program Committee, 1937 National IRSM Convention. Chairman Chicago Chapter 1937. Elected to Board of Trustees 1937.

The affairs of the Institute of Radio Service Men have been stimulated as a result of a revision of organization activities, approved unanimously by fourteen members of the Board of Trustees from all sections of the country at the annual meeting of the Board held at the Stevens Hotel, in Chicago, June 12 and 13. Joe Marty, Jr., the newly elected secretary-treasurer, as acting executive secretary, has taken charge of the management of the Institute's business.

"Under the new plan," says Mr. Marty, himself a Service Man, "The affairs of the Institute are guided entirely by men who are actively engaged in the service business."

Mr. Marty then outlined certain phases of the new program. "Every member," he said, "Will receive a subscription to the IRSM News and Digest, the Institute's house organ; and a copy of the IRSM Questions and Answers Handbook, a textbook written by Service Men for Service Men. Plans are being made to offer a year's subscription to SERVICE or one of two other trade papers as a part of the membership, the subscription to be paid annually at the expense of the Institute as the member pays his dues. Each member will receive a membership card, certificate, and a window decalcomania. All this is in addition to the gains the Institute will continue to make for the Service Man as a National Organization."

"A member of the Institute will automatically become eligible to take the examinations prescribed to become a "Radioneer," but the exercising of this option is entirely voluntary on the part of the member. Such examinations will be given at the lowest cost to the member, commensurate with the actual expense of conducting the examination, issuing the credentials, and carrying on such work as is necessary."

"We are receiving new applications for affiliation daily; and are handling correspondence on technical and general subjects by our own staff with dispatch."

Don Stover

Cleveland Chapter

June, the month of vacations and weddings (and radio shows) found us in the process of moving to newer and larger quarters.

We were very fortunate in having a recent joint meeting with G.E. Frey Ray, district sales manager and our own chairman, Bob Kline presided at the meeting. Johnnie Wall, formerly from Cleveland and now with G. E. in Bridgeport, explained innovations in the G. E. line, such as the noise limiter, phase inverter, a/c and auto radio antenna matching. G. E.'s tube merchandising plan was also discussed.

Messrs Williams, Barnhart and Weiss were on hand representing Hickok. Barnhart dwelt on tube checkers. Walter Weiss (than which there is no weiser) gave us

the low down on zero-current voltmeters and Prof. Williams sat and looked wise and mentally figured the gross sales, if any.

Floyd Sherman (no relation to the General) manipulated the sound projector to give us "Borden & Bussey," a talkie on the four salient points for good salesmanship. I hope part of it sunk in, the world can use Servasalesmen.

And by the way, we now have fourteen Radioneers in our fair city, nothing much to brag about, but its a good start.

The Cleveland Chapter has completed a well rounded Spring program. Numerous joint meetings have been held with practically every local set distributor. Maynard Elliott (oscilloscope demon deluxe) has managed to keep the boys informed on whats new in test equipment and gadgets.

We wish to report that our opinion is that the recent parts show in Chicago was a wow and the powers behind it are to be congratulated. We would like to see the set manufacturers in on the next one with technical talks and clinics on their new lines for the Service Man. After all we are the ones who keep the sets sold.

The Fourth Annual Cleveland IRSM Picnic will be held Sunday, August 22, at Hutters Farm, Brecksville, Ohio. This is a swell place for an outing and elaborate plans are underway for a gala time. Service Men everywhere are invited (bring your own lunch). . . . We'll see you August 22. . . .

L. Vangunten, Official Observer

CHICAGO TRADE SHOW

The largest attendance at a radio trade show since the last (1932) RMA Convention and Trade Show in Chicago was recorded at the Radio Parts Manufacturers National Trade Show, which ended its four-day run at the Stevens Hotel, Chicago, June 13.

A total of 6,500 individual registrations were recorded by the Show Staff. The foreign registrations included radio men from Argentine; Austria; Belgium; Brazil; Cuba; Czechoslovakia; England; Mexico; and Scotland.

Most every Canadian province was also represented at the show.

Specific indication of the national interest in the Trade Show was evidenced in the roll call of the 30 men who made the trip from the Stevens to inspect NBC's Studios, in the Merchandise Mart. When N. F. Andruss, Pacific Sales Corp., San Francisco, who guided the party, called the roll men from twelve different states responded. They were all the way from Boston to San Francisco, and from Texas cities to South Carolina.

When the doors opened at 2:00 o'clock Thursday afternoon, there was an eager crowd of manufacturers, jobbers, Service Men and dealers, awaiting to inspect the offerings of the 119 exhibiting manufacturers, who with four trade papers, occupied 143 booths—all that could be crowded in Chicago's largest exhibition hall.

Of the 6,500 who registered at the Trade Show about 700 were jobbers, 700 manufacturers representatives, 650 engi-

ASSOCIATION NEWS—continued

neers, 600 "hams," 1,900 Service Men, 250 retailers out of which more than 100 were exclusive retailers, and about 1,200 were of all other classifications, besides the exhibitors and their booth attendants.

At the close of the Show, it was announced by the management that October 1-3, inclusive, had been selected as the days for the New York National Trade Show this fall.

Ken Hathaway, Managing Director

NEW YORK PARTS SHOW

Arthur Berard and Arthur Moss, Vice-President and Secretary-Treasurer, respectively, of the Radio Parts Manufacturers National Trade Show, in conference today with the Show Committee of the Eastern Division of the Sales Managers Club, comprising Charles Golenpaul, Paul Ellison, and Walter Jablon, unanimously agreed to hold the 1937 New York National Trade Show at Commerce Hall in the Port of New York Authority Building and designated the Victoria Hotel as the Show and Convention Headquarters.

Commerce Hall is located at 15 Street and 8 Avenue, an express stop on the Independent Subway. A block away is the 7-Avenue Subway. A bus line passes the door, and there is another bus line on 7 Avenue.

Transportation between Commerce Hall and the Victoria Hotel where the Show will have its headquarters is excellent. The Forest Hills Branch of the 8-Avenue Subway has a station at 7 Avenue and 53 Street, a tenth of a mile from the Victoria. Not more than 10 minutes will be required to go from Commerce Hall to the hotel.

The Committee also agreed to hold the Show on Friday, Saturday, and Sunday, October 1, 2, and 3.

RADIO SERVICE ASSN. OF CALIFORNIA

We had an excellent talk on color, light and lighting effects at the meeting held June 7, at 921 Harrison St., Oakland, Cal. Robert S. Prussia, lighting engineer, had a miniature stage on which he showed the effects of various colors and placement of lights. We are indebted to Dudley Hoyt for arranging this interesting meeting.

Al presented the 6C8 and 6X5 tubes for our thorough and thoughtful digestion.

A travel picture showing a cloud of dust created by one Chevrolet, Old Faithful bound, closely pursued by a thing laughingly spoken of as a trailer was also presented at the meeting, through the courtesy of General Motors.

At the meeting held June 21, Carl Pen-ther presented some interesting motion pictures which have been loaned through the courtesy of the Massachusetts Institute of Technology. These are high-speed pictures, taken 2,000 to 6,000 per second using stroboscopic light, and show such things as birds and insects in flight, splashing of falling liquids, air currents through fan blades, etc. Carl also described the electrical and mechanical details of the system used in taking these pictures.

Now about this picnic. The Board had a meeting and it was decided that we have our annual picnic on Sunday, Sept. 12. Now we can start scaring up enthusiasm and gate prizes. Any member turning in information leading to the donation of a gate prize will be awarded a gassy 6L6, or equivalent.

By the way, it seems kind of cock-eyed to us that these picnics, parties, and such are financed by the members who pay their dues and yet are enjoyed as well by the members who seem to have forgotten all about paying them. According to the constitutional several of the fellows are al-

ready first-class candidates for the Can and it seems only fair that they make some effort to pay up, at least in part, or else.

H. R. Anderson, Secretary

RADIO SERVICEMEN'S ASSN. OF PITTSBURGH

Well! Well! How did you birds get over the last party? Wasn't it a swell affair? If anyone didn't have a good time it most certainly was their own fault. From our point of vantage on the floor we were able to look around and observe what serious minded Service Men do when out on a spree, and as far as we could see in the dim light not one face registered sadness or dissatisfaction. Another point we would like to bring out is the excellent way everyone behaved. Maybe the presence of the better half had something to do with it? Whatever the reasons were it speaks well for the organization.

We didn't intend to say anything about the new policy that is to be inaugurated by R.S.A., but the work performed by the committee in changing over the constitution merits more than vocal praise.

At the meeting June 8, in the Schenley Hotel, Robert G. Herzog, Editor of SERVICE Magazine lead a discussion on "Intercommunicating Systems," with accompanying lantern slide illustrations. Many of the technical, sales and legal aspects of the subject were brought to light. Sam Avins, a local Service Man who has just finished studying for a law degree and takes the bar exams next month, lent a hand in explaining franchise and license difficulties.

Word comes from Marshall V. Mansfield that he is the proud papa of a bouncing (eight and a half pounds) baby boy.

Joe Guzik

The artist went to work in the National Union Radio Corporation booth at the Chicago Trade Show. Representative caricatures of attending Parts Jobbers are given below.



RUSSELL E. ARCHER
TERRE HAUTE, IND.



RALPH M.
PEFFER
HARRISBURG
PA.



MILTON
FISCHER
NEW YORK



L.K. RUSH
BEMIS, TENN.



MORRIS
LEVITIN
SEATTLE
WASH.



N.L. STRAUB
JOHNSTOWN, PA.



BOB N. CRODEN
FT. DODGE, IA.



HARRY B.
GREEN
DALLAS,
TEXAS.



DALLAS W. JANSEN
APPLETON, WIS.



LYVAL C. CUMMINGS
DANVILLE, ILL.

HIGHLIGHTS ...

GHIRARDI TROUBLE SHOOTERS

Alfred A. Ghirardi, author of "Radio Physics Course," has released his so-called "twin-gadgets" for trouble shooting. One is the "Home-Radio Pocket Trouble Shooter" and the other "Auto-Radio Trouble Shooter." The first is a revised edition of Ghirardi's previous pocket trouble shooter. The other supplies similar information for auto-radio receivers.

Additional information and prices may be obtained from the Radio & Technical Publishing Co., Department 36, New York City.

HYTRON CALCULATOR

The Hytron Corp., radio tube manufacturers, at Salem, Mass., announce a new and novel resistance tube price list and interchangeable calculator.

In addition to listing standard glass and metal types it has a feature enabling the determination of the equivalent interchangeable standard type number to use. This is accomplished by means of a rotating disk having two slots; in one which



appears the special type number, in the other slot appears the Hytron type number to use having the same electrical and wiring characteristics.

Service Men and dealers may obtain one or more of these calculators directly from Hytron.

AMPHENOL CATALOG

The American Phenolic Corp., 507 S. Throop St., Chicago, announce a revised edition of their catalog. The catalog is a complete listing of their various radio sockets, cable plugs and connectors, microphone connectors, "magic-eye" assemblies and associate equipment. Copies will be sent free, upon request.

TRIPLETT BULLETIN

Triplett Electrical Instrument Co., Bluffton, Ohio, has issued a two-color bulletin illustrating and describing their latest models of tube testers, multimeters, test bench panels, signal generators, etc.

Copies of the bulletin (Form 5-26-37) may be obtained directly from Triplett.

WRIGHT-DECOSTER CATALOG

Wright-DeCoster, Inc., St. Paul, Minn., have issued a catalog of their line of electro-dynamic and "Nokoil" speakers; speaker cabinets; horns and accessories.

Copies of the catalog may be obtained directly from Wright-DeCoster.



Daniel T. O'Brien
Sales Manager, Cinaudagraph Corp.

WESTON BULLETIN

An illustrated bulletin giving details concerning recent additions to the Weston line of servicing instruments is now available to Service Men. Featured in the publication are the Model 773 tube checker, and the Model 775 "Combination Serviset." Complete specifications on the Model 772, 20,000-ohm-per-volt analyzer and the Model 771 "Checkmaster" are also included.

Copies of the publication, No. R-15-A, may be obtained by writing the Weston Electrical Instrument Corp., Newark, N. J.

VOCAGRAPH BULLETIN

Electronic Design Corp., 164 N. May St., Chicago, have released a bulletin describing their Vocagraph "hushed power" sound systems. Copies may be obtained directly from the manufacturer.

AMERICAN APPLIANCE ASSOCIATES, INC.

A new company has been incorporated under the name American Appliance Associates, Inc., with headquarters in the Central Terminal Building, Albany, N. Y. The new corporation will merchandise radio parts and tubes under a common trade name.

M. A. Feldstein is in charge of the engineering department; A. O. Linzey, financial and credit departments, and L. T. Holland, the sales department.

For the next few months the activities of the company will be confined to New England, New York and Pennsylvania.

KEN-RAD NEWS

Eugene Carrington is now the Chicago district sales representative for the Ken-Rad Tube & Lamp Corp., Owensboro, Kentucky.

George E. Phillips of Ken-Rad has just completed an itinerary covering the principal distributing points from the Great Lakes to the Gulf of Mexico.

T. T. Scott, sales representative of Ken-Rad, has been transferred from the Detroit territory to the Cincinnati area.

"Bud" Mathews, sales manager, attended the Southwest Radio & Electronics Show at Dallas and then called on Ken-Rad distributors at Houston, San Antonio, New Orleans, Little Rock and Memphis.

MALLORY ACQUIRES ELECTRAD

P. R. Mallory & Co., Inc., Indianapolis, Ind., announce the purchase of the assets, good will, trade marks, patents and patent rights of Electrad, Inc., of New York City. L. A. de Rosa, chief engineer and other key employees of Electrad, Inc., will join the Mallory organization. Plant and offices will be moved to Indianapolis.

ACRO BULLETIN

The Acro Tool & Die Works, 1401 Wilson Ave., Chicago, have issued a bulletin illustrating and describing their Acro chassis cradle.

Copies of the bulletin may be obtained directly from the manufacturer.

ARCTURUS ADVISOR TO CHINA

Officials of the National Government of China and executives of the Arcturus Radio Tube Company, Newark, New Jersey, concluded a contract recently naming that company as official technical advisors and counsellors to assist the Republic in its radio tube manufacturing program.

In preparation of this program, Kyi-Tsing Chu, former chief engineer of the Radio Administration, Ministry of Communications of the National Government of China, and associates representing the National Resources Commission visited various radio tube factories during the few months they have been in the United States.

(Continued on page 440)



Chinese government officials visit the Arcturus plant.

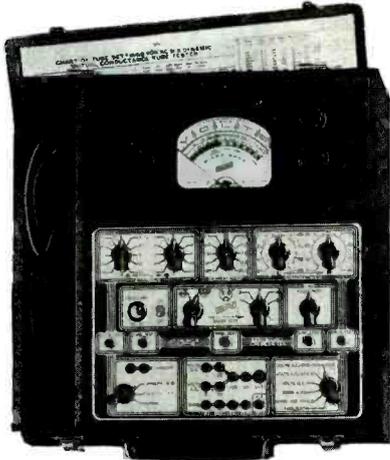
NEW



AC 51X DYNAMIC MUTUAL CONDUCTANCE RADIO TUBE TESTER

with

A.C., D.C., Volts, Ohms, Milliamperes, Capacity,
Condenser Leakage, Inductance, Output
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See if you can match these comprehensive tests in any similar instrument.

Special HICKOK Square Meter—scale length over 3¾"—is easy to read on all scales. Accuracy 1½".

TUBE TEST SECTION indicates "Good," "Replace" or "Doubtful" as well as readings in micromhos. Diodes tested separately for emission on special scale.

SET TEST SECTION indicates A.C. and D.C. Volts in various ranges; D.C. Milliamperes to 200; Ohms to 5 megohms (NO BATTERIES USED); Capacity to 24 Microfarads. No copper rectifiers are used in any ranges.

The Dynamic Mutual Conductance and other Special HICKOK Features make this instrument doubly valuable to every service man.

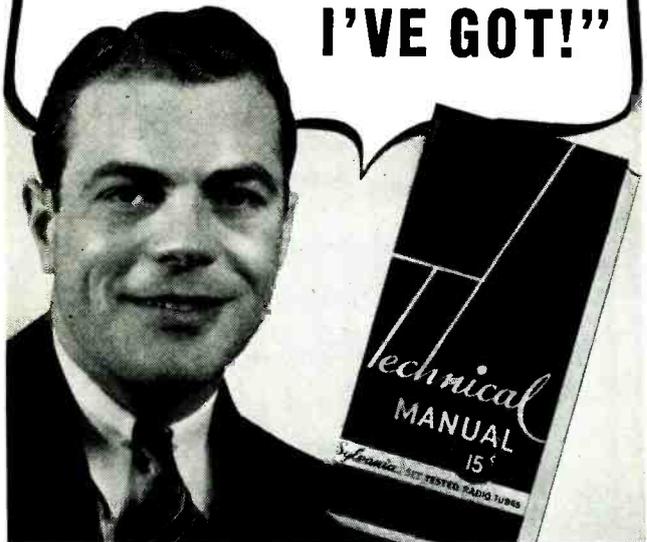
COMPLETE LINE OF HICKOK TEST EQUIPMENT

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| SET TESTERS | ZERO CURRENT VOLT |
| TUBE TESTERS | METERS |
| OSCILLATORS | SPEAKER TESTERS |
| MODULATORS | APPLIANCE TESTERS |
| OSCILLOGRAPH | VOLT OHM MILLIAMPERES |
| | CAPACITY TESTERS |

Write for complete information on the AC 51X and the other HICKOK TEST INSTRUMENTS.

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ELECTRICAL INSTRUMENT CO.
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I'VE GOT!"**



"—My Sylvania Technical Manual"

"'A friend in need is a friend indeed.' And that's the way it is with my Sylvania Technical Manual. It helps me in the tight spots . . . solves my radio service problems, saves me time and money, gives me *real* advice, like a real friend should."

The Technical Manual is *crammed* with information! 184 pages long, it lists 193 tube types with circuit application information on each. Tells all about glass, metal and "G" type tubes, as well as those for Majestic receivers. Gives full information on Sylvania "Ballast Tubes." And the Technical Manual fits into your service kit easily.

Friends can't be bought? Send 15c. with the coupon below. See if you don't get the best friend you ever had!

Hygrade Sylvania Corporation, makers of Sylvania Radio Tubes and Hygrade Lamp Bulbs. Factories at Emporium, Pa.; Salem, Mass.; and St. Mary's, Pa.

SYLVANIA

SET-TESTED RADIO TUBES

HYGRADE SYLVANIA CORPORATION
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I enclose 15c for which please send me a copy of the new Sylvania Technical Manual. I am (check below):

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Name

Address

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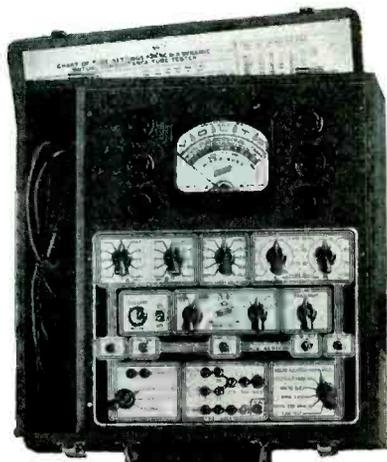
Name of Jobber.....

Address

THE MANUFACTURERS . . .

HICKOK INSTRUMENTS

Hickok Electrical Instrument Co., Cleveland, Ohio, announced two new instruments: the model AC-51X tube tester and the model RFO-3 junior oscillograph.



The model AC-51X not only tests tubes but also indicates volts, ohms, milliamperes, microfarads, capacity leakage and decibels.

The RFO-3 contains a built-in electronic frequency modulator designed to operate with practically any service oscillator. A wide-range sweep circuit is also included in the instrument.

Additional information on the above instruments can be obtained from Hickok.

GENERAL AUTO AERIALS

A new line of auto-radio aerials has been introduced by the General Antenna Co., 646 E. 75th St., Chicago. A telescopic buggy-whip, a running board type and an over-the-top type are included.

A descriptive and illustrative catalog may be obtained directly from the manufacturer.

SHURE TRI-POLAR MICROPHONE

Among the items described in a new catalog, available from Shure Brothers, 225 W. Huron St., Chicago, is their tri-polar



controlled direction crystal microphone. This unit provides switch controlled uni-directional, bi-directional and non-directional response in one microphone.

Copies of the catalog may be obtained directly from Shure Brothers.

LAFAYETTE TRAILER RECEIVER

Radio needs of the summer tourist for the trailer, the motor boat or summer camp, are met in the 6-volt d-c, 110-volt a-c 2-band receiver developed by Lafayette Manufacturing Co. as their model D-32.

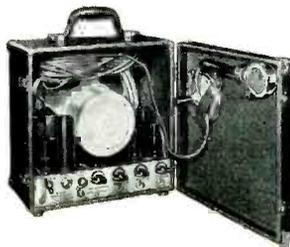
Six-volt storage battery and standard a-c line serve equally well to operate this mantel-type radio.

Additional information can be obtained from the distributors, Wholesale Radio Service Co., Inc., 100 Sixth Ave., New York City.

SUNCO SOUNDMASTER

The Soundmaster, recently announced by Sundt Engineering Co., 4238 Lincoln Ave., Chicago, is a self-contained microphone-amplifier-speaker in a light, portable case.

Two extra inputs are provided for microphone, radio or phonograph. The power output is 12 watts. It is equipped with a



12-in dynamic speaker.

Additional information may be obtained directly from the manufacturer.

UNITED SOUND CALL-PHONE

The United Sound Engineering Co., St. Paul, Minn., has announced their Call-Phone intercommunication systems.

The illustration shows the Personal



Call-Phone which is equipped with an earphone. Raising the earphone from its rest makes conversation confidential by bringing the other party's voice over the earphone instead of the loudspeaker. Other units in the system include the Standard Call-Phone, which has no earphone, the Switchboard Call-Phone for use by telephone operator in extensive installations, and the Paging Call-Phone which amplifies the call over large areas.

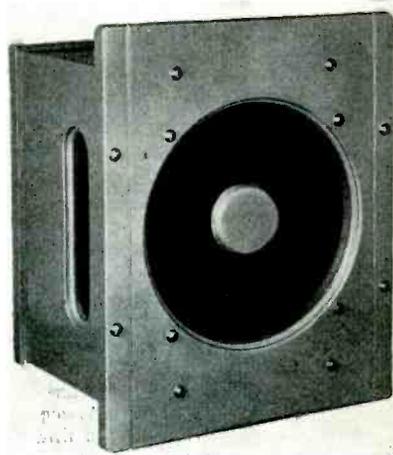
These units are finished in smooth black with aluminum trim. The Call-Phone is licensed under A. T. & T. and Western Electric patents.

Additional information can be obtained from the manufacturer.

JENSEN "PERI-DYNAMIC" REPRODUCERS

Jensen is introducing a line of "Peri-Dynamic" reproducers, using 8-in., 10-in., 12-in. and 15-in. speakers.

The Peri-Dynamic principle utilizes a



speaker in conjunction with an enclosure.

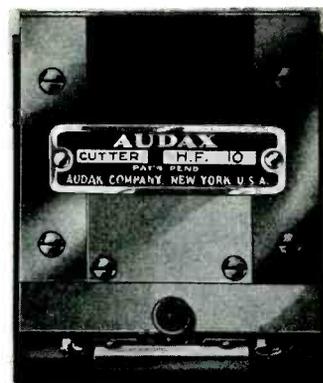
Write to Jensen Radio Manufacturing Co., 6601 S. Laramie Ave., Chicago, for further information.

ELECTRO-VOICE MICROPHONE

The Electro-Voice Mfg. Co., Inc., 324 E. Colfax Ave., South Bend, Ind., have announced their V-1 velocity microphone. The new unit is said to be free from r-f pickup and has shock proof cradle mounting. The output level is approximately -68 db.

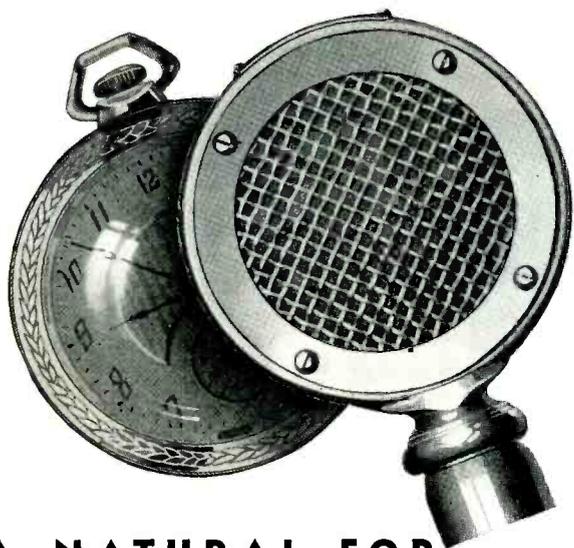
AUDAX PROFESSIONAL CUTTER

The Audax Professional 10-A cutter, manufactured by Audax Co., 500 Fifth Ave., New York City, has been introduced to the trade. This cutter is designed to deliver the same professional results in instantaneous recording as obtained in the studios of record makers. It is available in any impedance up to 500 ohms.



The Audax 10-A will record maximum sound levels on nitrocellulose records with an input of about 18 to 20 db, it is claimed. It is effective on such material to over 8000 cycles. On wax it is said to record at a lower level.

WATCHCASE TYPE



A NATURAL FOR PUBLIC ADDRESS WORK

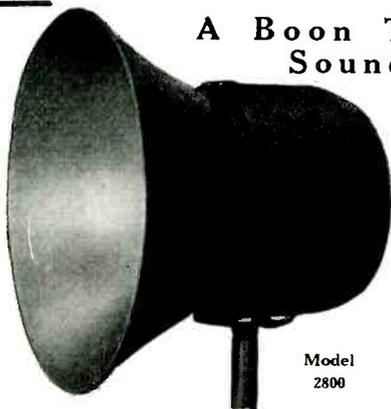
Ask your jobber to show you the Astatic Model D-2—that compact, sturdy dual diaphragm, non-directional crystal microphone that is so popular for public address work. Equipped with Astatic plug and socket Connector which permits interchange of cables on same microphone—PLUS special Spring Cable Protector and cushioned interior. List Price \$25.

Licensed under Brush Development Company Patents

Astatic Microphone Laboratory, Inc.
DEPT. S, YOUNGSTOWN, OHIO

METALEX EXPONENTIAL HORNS

A Boon To The Sound Engineer



Model 2800

- Steel for Wear
- "Ex" for Objectable Resonances

These efficient exponential horns should not be confused with the so-called parabolic units.

Spun from steel and coated with the material "Ex" which eliminates all objectionable resonances, they give the finest type of reproduction and almost unlimited wear. Stocked in 3 different sizes.

Write for literature on these horn innovations.

Wright-DeCoster Distributors are always anxious to cooperate.

WRIGHT-DECOSTER, INC.

2253 UNIVERSITY AVE. ST. PAUL, MINN.

Export Dept.: M. Simons & Son Co., New York

Cable Address: "Simontrice"

Canadian Representatives

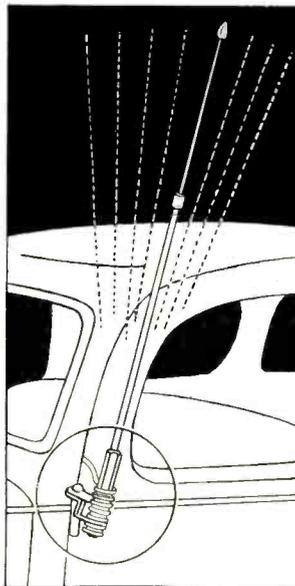
Wm. F. Kelly Co., 1207 Bay St., Toronto, Ont.
Taylor & Pearson, Ltd., Edmonton, Alt.



Announcing Two New ★ ★ ★
OUTSTANDING ADVANCED DESIGN
1938 AERIALS BY RADIART

TILT HINGE

(Original Adjustable Hinge Aerial)



★ New extension type adjustable mounting angle hinge aerial. Rustproof stainless steel and brass, nickle and chrome plated. No holes to drill.

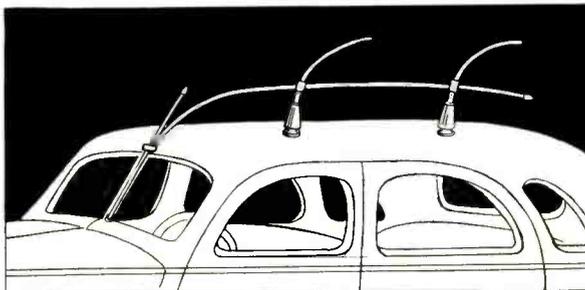
★ Easy to install, yet eliminates that awkward appearance by adjusting to slope of windshield. We predict that this very desirable feature will set a new style in hinge aerials.

★ Beautiful matched teardrop tip and modernistic insulator made of extra strength plastic in translucent red.

Patent Applied for

LIST PRICE

Extension Type HTE-R only.....\$2.75
(Also furnished in Whip Type HTW-R Forged Triple Plated Steel at \$3.50)



Patent Applied for

STREAM LINED KATS WHISKERS

(Original Kats Whisker Aerial)

- ★ Double Strength Pick Up on account of extra height and no additional capacity.
- ★ New Non-Shorting Type of Insulator.
- ★ New Non-Wobble Insulator Mounting. Rustproof brass, nickle and chrome plated.

Priced from \$4.00 to \$5.00

Be the first to offer these new and better aerials in your community. Also cowl, window, bumper and under car aerials. Send for catalogue sheet No. 637-B on complete line of New Radiart Aerials.

THE RADIART CORPORATION
CLEVELAND, OHIO

MANUFACTURERS—continued

RECOTON ELECTRIC PHONOGRAPH

The Recoton Corp., 178 Prince St., New York City, have introduced their phonograph motor and crystal pickup, mounted in a walnut, hand-rubbed case. By means of a novel arrangement the entire mechanism opens from the front outwardly to allow changing the record. This permits placing the radio on the top of the phonograph case without the necessity of removing it.

Additional information may be obtained from the manufacturer.

SOLDER IRON HEAT CONTROL

A device which acts as a stand and also provides for heat control of the solder iron has been introduced by Drake Electric Works, Inc., 3656 Lincoln Ave., Chicago.

A descriptive and illustrative bulletin may be obtained from the manufacturer.

AUTO-RADIO TUNING WRENCHES

J. F. D. Manufacturing Co., 4111 Fort Hamilton Parkway, Brooklyn, N. Y., are



introducing a complete set of tuning wrenches and shortened car controls for aligning the chassis in the car or on the bench.

Several types of adjustable bushings and flexible shafts are included in the set, which is housed in a leatherette roll case.

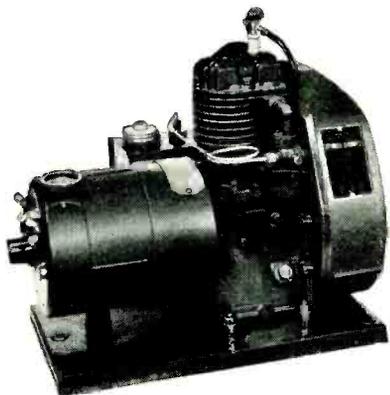
A descriptive and illustrative bulletin may be obtained from the manufacturer.

WEDGE POWER PLANT

A portable power plant is announced by Wedge Manufacturing Co., 300 W. Adams St., Chicago. The 2-pole, d-c generator is direct connected to a 4-cycle, $\frac{5}{8}$ -hp gasoline engine. The unit is governor controlled for constant speed.

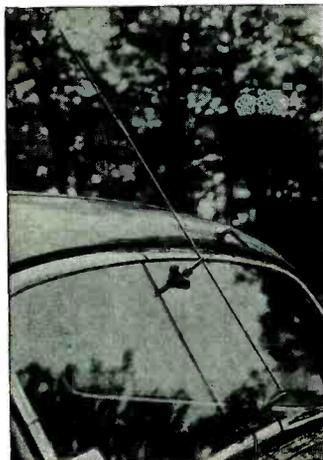
Up to 200 watts are available from either the 6-, 12- or 32-volt d-c plants.

Additional information may be obtained from the manufacturer.



BURTON-ROGERS AUTO AERIALS

The Burton-Rogers Co., 755 Boylston St., Boston, Mass., are introducing a line



of over-the-top and buggy-whip auto-radio aerials. No drilling is necessary for installing any of the types.

OHMITE VITREOUS ENAMEL RESISTORS

The Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago, have announced a new vitreous enamel resistor. The unit is solenoid wound with resistance wire, over a porcelain core. The copper terminals are tinned for easier connection. Mounting brackets are also provided.

Additional information may be obtained from the manufacturer.

CORNELL-DUBILIER CAPACITORS

The accompanying illustration shows the comparative sizes of Cornell-Dubilier's etched foil and dry electrolytic capacitors



and equivalent plain foil types. Cornell-Dubilier's line of electrolytics include the type KR metal container and JR silver cardboard container etched foil series in capacity ranges from four to sixteen microfarads, including the popular multiples, rated at 200 to 525 volts.

BOGEN AMPLIFIER

David Bogen Co., Inc., 663 Broadway, New York City, are featuring their Model CX-30, a 30-watt, beam-power amplifier with a dual channel tone corrector which provides separate controls for high and low frequencies. The overall gain of the amplifier is 128 db. Four channel input is provided, a total of 12 tubes are used.

Additional information may be obtained from the manufacturer.

AEROVOX OIL FILLED CAPACITORS

High-voltage oil-filled capacitors in round cans, arranged for inverted mounting, are offered by Aerovox Corp., 70 Washington St., Brooklyn, N. Y. These units are similar in general appearance and size to electrolytic condensers. The section of linen paper and foil, oil impregnated, is hermetically sealed in the aluminum can. There is an insulated center terminal and grounded can. Fittings supplied with each unit permit insulating the can from the chassis and providing a second insulated terminal. Units are available in 600, 1000 and 1500 volts d-c working, and in capacities of from 0.5 to 4 mfd.

OPERADIO PORTABLE AMPLIFIER

The Model 117, 14 to 26-watt portable amplifier announced by Operadio Mfg. Co., St. Charles, Ill., uses beam-power tubes, mixes two microphones and a phono pick-up, incorporates two speakers and a tone control.

The unit furnishes the field supply for



the two electro-dynamic speakers which are included with it. It can also be used with permanent magnet dynamics.

Additional information may be obtained from the manufacturer.

GRIP-POINT SCREWDRIVER

A screwdriver, marketed by the Stromberg Motoscope Corp., 2701 Belmont Ave., Chicago, has a grip-point which, when released by a lever, ejects and rotates gripping the screw slot. The tool is designed to be of assistance to Service Men in anchoring screws in hard-to-get-at-places.

"INSTANSOLDER"

Cole Radio Works, Caldwell, N. J., are introducing a unique soldering device called "Instansolder." The outfit differs from the conventional soldering iron in using a small arc for heating instead of the usual wire heating unit. Soldering heat is produced almost instantly, it is said.





THE BRUSH TRANSFILTER FILLS THE GAP

● The transfilter fills the selectivity gap between the electrically tuned circuit and the quartz filter. A transfilter can be employed in any superheterodyne whose intermediate frequency amplifier can be tuned to 465 kilocycles.

Technical data on request

The BRUSH
Development Company
3317 Perkins Avenue, Cleveland, Ohio

NOISE-MASTER ALL-WAVE ANTENNA

**Kills
"Man-made" Static**

"NOISE-MASTER"
No. 14
List Price \$8.75

Brings in overseas signals stronger, and eliminates "man made" static on broadcast as well as short-wave band. For better reception in EVERY location.

"NOISE-MASTER"
No. 18
List Price \$3.40

First time at this popular price a SELF-SELECTING antenna of the simple doublet type, designed to clear up short-wave reception.

"NOISE-MASTER"
No. 19
List Price \$4.30

This is another SELF-SELECTING model of the doublet type, with junction-box in the antenna line. Assures finer all-wave reception.



This trademark guarantees the best in antenna and radio wire products.

CORNISH WIRE CO., Inc.
30 CHURCH STREET NEW YORK CITY



**On Broadcast as Well as
on Shortwave Frequencies**

Licensed by Amy, Aceves & King, engineered by Corwico . . . every Service Man knows that's plenty to say about any antennal Try one of these modern units on your next installation . . . a real good will builder for YOU!

Write for descriptive literature



**Free
Trial**

THE BOGEN SUPREME AMPLIFIER WITH ELECTRONIC TONE CORRECTOR

● Not the usual Tone Control or frequency equalizer—but a new circuit (patent pending) giving complete control of frequency response.

● Most radical development in P. A. for years. Overcomes faulty acoustics. Provides startling effects for the sound operator. Novel pre-amplifier stage for reducing hum.

● Illustrated: Model CX30—12 tubes—30 watts output. Four channel input—gain 128 db.

Write for New Catalog

DEALERS—your Bogen jobber offers this amplifier on a free trial basis. Don't fail to take advantage of what promises to be the outstanding amplifier of the year.

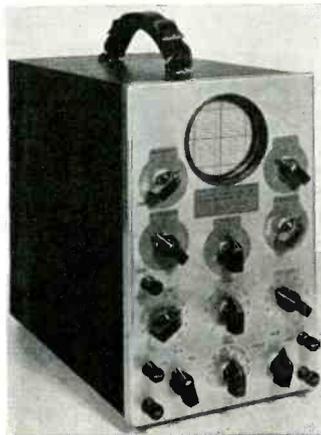
DAVID BOGEN CO., Inc.
663 Broadway, New York City
"Pioneers in P-A Development"

RUGGED — DEPENDABLE — ACCURATE DU MONT TYPE 164 3-INCH SERVICE OSCILLOGRAPH

ONLY

\$54.50

Complete



A real service instrument built especially for the service engineer with the same skill and care that has made Du Mont instruments the choice of the leading industrial and college laboratories of the world. Complete in every detail the 164 offers the desirable features of vertical and hori-

zontal amplifiers, amplified sweep, internal or external positive synchronization and separate positioning controls on the front panel. The 164 is designed to operate with any standard type of frequency modulated oscillator.

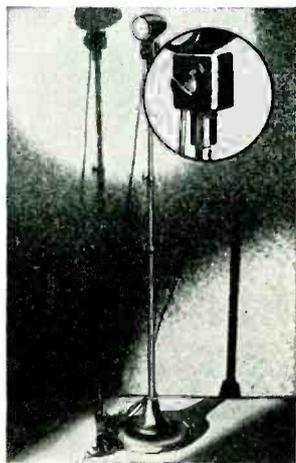
Ask Your Jobber

Allen B. Du Mont Laboratories, Inc.
Upper Montclair, New Jersey

MANUFACTURERS—continued

EPIPHONE BULLET MICROPHONE

Epiphone, Inc., 142 W. 14 St., New York City, have introduced a "Bullet" microphone with the volume control incorporated



ted in the mike stand.

The unit operates on the dynamic microphone principle; has an impedance of

approximately 50,000 ohms and an output about the same level as that of a carbon microphone.

Additional information may be obtained from Epiphone.

CINAUDAGRAPH SPEAKERS

The Cinaudagraph Corp. of Stamford, Conn., announces a new series of small speakers. Although the speaker diameters are only five ins., the units incorporate the three Cinaudagraph features, namely: the polyfibrous cone material, the dust-proof voice coil and the magnet alloy, "Niper-mag."

Additional information may be obtained from the manufacturer.

G. E. INTERCOMMUNICATORS

An intercommunicating system called the "Handy-Phone" has been introduced by General Electric Co., Bridgeport, Conn. The system consists of one Model FM-41 master station and from one to four Model FS-5 remote stations. The system operates on either a-c or d-c.

Additional information may be obtained from G. E.

UNIVERSAL DYNAMIC MICROPHONE

James R. Fouch, president of the Universal Microphone Co., Inglewood, Cal., announced Universal's latest addition to their line. The new unit is a self-energizing dynamic microphone with a self shield-



ing square-core transformer.

An output level of approximately -58 db is provided with a frequency response from 40 to 8000 cps.

Additional information may be obtained from the manufacturer.

HIGHLIGHTS—continued

RCA PARTS CATALOG

An illustrated parts catalog for the Service Man and dealer has been issued by the RCA Manufacturing Co., Camden, N. J., for selective distribution.

The cross-indexed guide of replacement parts for the RCA Victor radio receivers and the corresponding models of the General Electric, Graybar and Westinghouse Companies, which was a feature of the previous catalog, has been brought up-to-date and included in the new volume.

Among the products featured in the RCA catalog are the various types of cathode-ray oscillographs, test oscillators, calibrating and modulator devices, service engineering tools, phonograph modernization and hard-of-hearing equipment, the various types of transformers, and auto antennas and short and all-wave antenna kits, a line of amateur receiving and transmitting apparatus, including amateur tubes, and other pieces of equipment for the Service Man and dealer.

TRIAD REPRESENTATIVES

Harry H. Steinle, vice-president and director of sales of Triad Manufacturing Co., Inc., Pawtucket, R. I., announces the appointment of two factory representatives.

Merton Dobbin of Portland, Oregon will represent the Northwest Territory and James C. Pope, Jr., of Minneapolis, Minn., will represent the states of Minnesota, North and South Dakota and Western Wisconsin.

WARD LEONARD ANNOUNCEMENT

Ward Leonard announces the extension of the territory now handled by W. Bert Knight, Inc., 115 W. Venice Blvd., Los Angeles, Cal., to include the whole state of California, on the sale of all Ward Leonard radio resistors, rheostats and relays.



MOSS SOLAR SALES MANAGER

Arthur Moss, formerly president of Electrad, Inc., has become sales manager of Solar Manufacturing Corp., 599 Broadway, New York City, manufacturers of condenser products, and Wickham Harter, who has been in charge of sales of that company since its organization, has been promoted to the position of general sales manager.

Mr. Moss for many years has been actively connected with the Radio Manufac-

turers' Association, representing on its Board of Directors the interests of the parts and accessory manufacturers in the radio industry.

TRANSDUCER CORP. MOVES

G. M. Giannini, president of Transducer Corp., announced from executive headquarters at 30 Rockefeller Plaza, New York City, that the Transducer factory, which had been located at 22 W. 48 St., has moved to new larger quarters at 455 W. 45 St.

In charge of activities at the new address are F. L. Lester, production engineer, and Ben Eisenberg, test and design engineer. Serving in the capacity of design consultant is Richard W. Carlisle, well known in radio engineering circles.

TACO ANTENNA DATA

Those wishing to know what's what in antenna technique will find answers to their questions in a catalog issued by Technical Appliance Corp., 17 E. 16 St., New York City. The several Taco antenna systems for individual receivers are illustrated and described. Also the master antenna system both for apartment house and large buildings, as well as for private dwellings. Lastly, there are set couplers, line-noise filters and wave traps for better reception under trying local conditions. A copy of this catalog is available on request.

CLOUGH-BRENGLE APPOINTMENT

The laboratory staff of The Clough-Brengle Co., 2815 W. 19 St., Chicago, manufacturers of electrical testing equipment, has recently been augmented by the addition of Dr. Maxwell R. Krasno, formerly research physicist in the department of physiology of the University of Wisconsin.

THANKS !

To the entire industry, thanks! We're accustomed to receiving a lot of attention on the Utah Line, but never before at any convention or exhibit have we been favored with so much active interest, so much genuine enthusiasm for our offerings, as we received at the last Radio Parts Convention in Chicago.

We are grateful, and take this means of expressing our appreciation to all those who visited our booth and our factory during the convention.

The enthusiasm expressed over Utah's Products is an inspiration to even greater efforts, both in the direction of quality and service.

We thank you!



UTAH RADIO PRODUCTS CO.

Orleans Street
CHICAGO, U. S. A.

BUENOS AIRES
UCOA RADIO CO.

TORONTO,
ONTARIO, CANADA

"16 YEARS OF LEADERSHIP"

FOUNDATION OSCILLOSCOPE WITH BUILT-IN 60 CYCLE SWEEP

- Uses No. 913 Tube with 1" Fluorescent Screen for Sharp Images
- Controls for Intensity Focus and Sweep Amplitude
- Vertical and Horizontal Deflector Plates
- A.C. Operated

A practical foundation unit for engineers, sound and radio servicemen. With proper external additions it offers facilities for the study and adjustment of countless circuit problems. May be adapted for R-F and I-F alignment, resistor, condenser, vibrator and many other tests.

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READRITE METER WORKS
717 College Dr., Bluffton, Ohio

Without obligation please send me more information on Model 840.

I am also interested in

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\$11.40
LESS TUBES

MODEL 840 READRITE RANGER



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THE Group Subscription Plan for *Service* enables a group of service men, dealers or jobbers to subscribe at one-half the usual yearly rate.

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(Service)

Bryan Davis Publishing Co., Inc.

19 East 47th Street

New York, N. Y.

A-F CURVE TRACING

(Continued from page 412)

from the output transformer. Resonant frequencies are indicated by the peaks. Fig. 3B shows the effect of bypassing high audio frequencies with a tone control. Quantitative data may be obtained by calibrating the ordinate in terms of voltage and the abscissa in terms of frequency, as shown in these figures.

This curve tracer is suitable for determining quickly and with fair accuracy the effect of changes in amplifier circuits. It is also suitable for practical testing of a-f amplifiers because of the

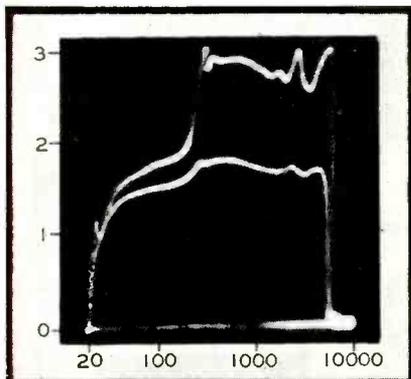
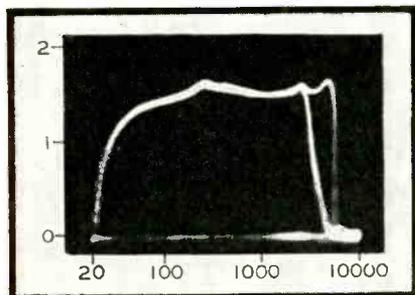


Fig. 3A. Curves showing effect of speaker load.

Fig. 3B. (Below.) Curves showing effect of tone control.



relatively short time in which a characteristic can be obtained. A single test yields data on the gain of the amplifier throughout a frequency range of interest. The accuracy of the results is ample for most practical applications.

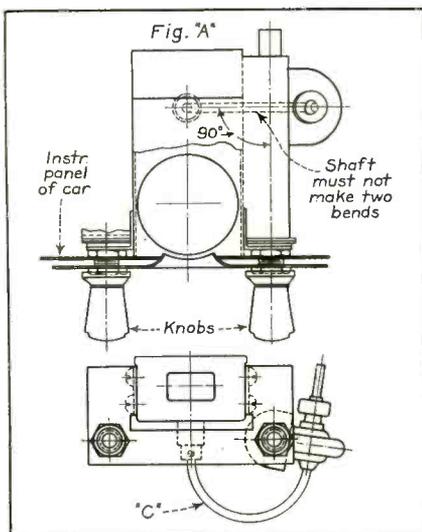
American Bosch 48

Fading: A cause of fading in the Bosch 48 series is due to the aerial tuning variometer. This part is keyed to the rotor of the tuning condenser and turns when the dial is tuned. It will be necessary to remove the variometer from the chassis, and dismember the variometer rotor to clean the bronze spring wiper that causes fading.

RCA Service Tip File

Arvin P28 to P45 Remote Controls

Backlash: Backlash on Arvin remote controls P28 to P45 inclusive may



occur occasionally. It may be attributed to the following causes:

(1) Misalignment between dial mechanism and dial drive member. The small flexible shaft linking the two assemblies must not make two bends. Thin washers are used to line up these members into which the shaft is inserted. See Fig. A.

(2) Play in worm-gear drive mechanism. This may be removed by tightening the small hex adjusting nut to the point where no backlash is perceptible.

(3) Kink in small dial drive flexible shaft. This small shaft must be straight and free from kinks. Otherwise backlash will be noticed on one end of the dial and not on the other.

(4) Excessive or insufficient amount of shafting C connecting dial to tuning member. When the small link flexible shaft is either too short or too long the curve it assumes is beyond its elastic limit and the detrimental effect is similar to that caused by a kinked shaft. See C in Fig. A.

Graphite grease should be used on the worm-drive gears and light motor oil for all other bearings in the control mechanism.

NOTHING LIKE THIS NEW "TRI-POLAR"



1. Uni-Directional
2. Bi-Directional
3. Non-Directional

All THREE in ONE Crystal Microphone

Now, for the first time—through the new Shure "Controlled-Direction" principle—you can have all three basically-different directional characteristics in one microphone—instantly available through a 3-point selector switch.

1. **Uni-Directional.** Wide-angle front-side pickup—dead at rear. Cuts out audience noise. Output level: 63 db below 1 volt per bar.

2. **Bi-Directional.** Typical velocity characteristic with pickup front and back—dead at both sides. Output level: 68 db below 1 volt per bar.

3. **Non-Directional.** Full 360-degree all-around pickup for group presentations and general applications. Output level: 53 db below 1 volt per bar.

Smooth wide-range frequency response from 40 to 10,000 cycles. Rugged, light, compact. Model 720A. List Price, complete with 25 ft. cable. \$39.50

For complete information, write for Bulletin 145S.

Shure patents pending. Licensed under patents of the Brush Development Company.



TWO WAY COMMUNICATION



Inter-'phones, office to office, studio to studio, factory, shipping depts., house to garage, and hundreds of other uses. Positive in operation. Simple to install. Modern in appearance. Any number of 'phones on same line.

\$15. per station (dealers and jobbers write for discounts).

UNIVERSAL MICROPHONE CO., LTD.

Box 299

INGLEWOOD, CALIF., U. S. A.

It's New! It's Modern!



12 Watt Streamlined BELL P. A. System

Nothing on the market to equal it! Improved in every respect. The ultra wide range crystal microphone, heavy duty twin speakers and high gain amplifier with Octal tubes combine to give this new Bell Streamlined Public Address system, power and tone fidelity that is amazing. Ideal for permanent or temporary installations. Complete system is encased in one unit for easy portability! Cash in on easy sales and profitable rentals. Write for complete details and specifications.

Specifications
 Power Output: 12 Watts
 Overall Gain: 124 D.B.
 Frequency Response:
 Within 2 D.B. from
 35 to 10,000 cycles.
 Circuit: 4 stage, Class
 A, resistance coupled.
 Tubes: Incorporates
 beam power type.

JOBBERS
 Write for details and
 territory information
 on Bell's complete line
 of P.A. equipment and
 communicating systems.

**Let Us Tell You
 About BElfone**
 The new interoffice
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 that is taking the
 country by storm. A
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 You will be interested.
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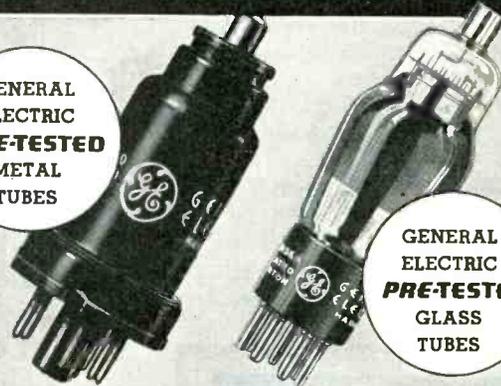
BELL Sound Systems, Inc.
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 Columbus, Ohio
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A COMPLETE NEW LINE FOR SALES AND PROFITS

GENERAL ELECTRIC PRE-TESTED METAL TUBES

GENERAL ELECTRIC PRE-TESTED GLASS TUBES



**FOR CUSTOMER SATISFACTION
 Use G-E RADIO TUBES**

Memo to:
Dealers and Servicemen
 Ask your G-E Radio Distributor for details of the G-E Radio Tube Merchandising Plan, or write to Radio Tube Sales Section, General Electric Company, Bridgeport, Conn.



GENERAL ELECTRIC

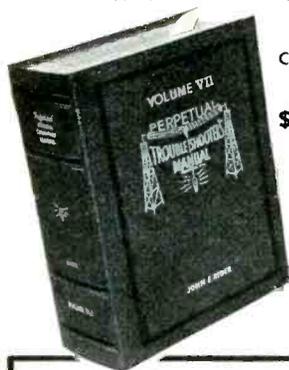
APPLIANCE AND MERCHANDISE DEPARTMENT
 GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.

"RIDER MANUAL OWNERS ARE THE KEY MEN OF THE SERVICE FIELD"



SAYS THE SALES PROMOTION MAN OF ONE OF THE BIG SET MANUFACTURERS

"Almost without exception the most successful servicemen in America are owners of complete sets of Rider Manuals."



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 NOW IN SEVEN VOLUMES

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ALIGNING PHILCO RECEIVERS

This new book presents authentic and complete instructions for fast and accurate alignment operation on ANY of the 8,000,000 Philco receivers. Every trimmer is located for you. 176 pp. Hard cover. Only **\$1.00**

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Familiarizes you with the different forms of alternating currents present in a radio receiver. Illustrated with drawings and oscillograms. **60c**

SERVICING SUPERHETERODYNES

Revised edition has complete list of i.f. peaks of commercial receivers. 324 pp. Over 100 illus. **\$1.00**

JOHN F. RIDER, Publisher, 1440 Broadway, N. Y. C.

Hundreds of units to choose from.

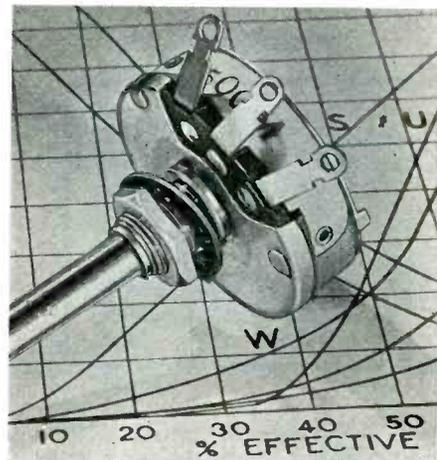
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 Composition and wire-wound types.

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 Exact resistance and taper required.

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 Correct shafts—no sawing or forcing.

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 Grid bias resistors supplied where needed.

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 Backed by most accurate and complete listing.



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You save time, trouble and money when you insist on CLAROSTAT Exact Duplicate Controls. • These units are right electrically, mechanically, visually. • And that fussy customer is satisfied. • So ask for your copy of our Volume Control Replacement Guide.

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CORNELL-DUBILIER TRIPLE SEALED ELECTROLYTICS



Illustrated is an internal-construction view of the Type JR "Dwarf-Midget" etched foil dry electrolytic. Note the three definite seals protecting the capacitor section from abnormal temperature and humidity conditions.

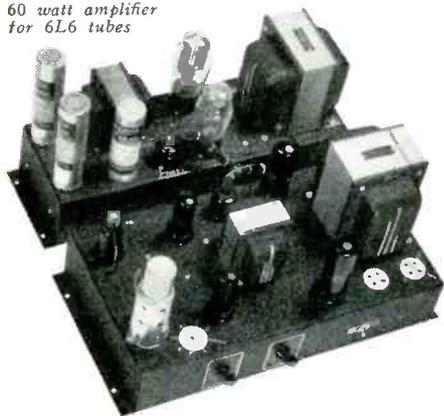
- 1—Outside silvered cardboard container.
- 2—Wax impregnated inner liner carton.
- 3—Chemically pure asphalt sealing compound.
- 4—Flap of outside container with riveted mounting lug.
- 5—Aluminum foil. (Cathode terminal)
- 6—Super-cellulose separator.
- 7—Terminal tab. (Anode)
- 8—Terminal lead riveted to flap on impregnated inner liner carton.
- 9—Flap of outside silvered container, designed so as to relieve any mechanical stress placed on terminal lead, thereby eliminating open circuits.
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GENERAL TRANSFORMER CORP.
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GENERAL DATA—continued

generator output should be reduced to a minimum consistent with a reasonable reading on the output meter. The receiver volume control should be turned to its maximum counter-clockwise position (full on) throughout the entire alignment procedure. The off-on tone control knob should be set for the position of maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set is on).

The position of the alignment trimmers is given in Fig. 1. The alignment operations are given in the accompanying table.

Philco "Cone-Centric" Tuning*

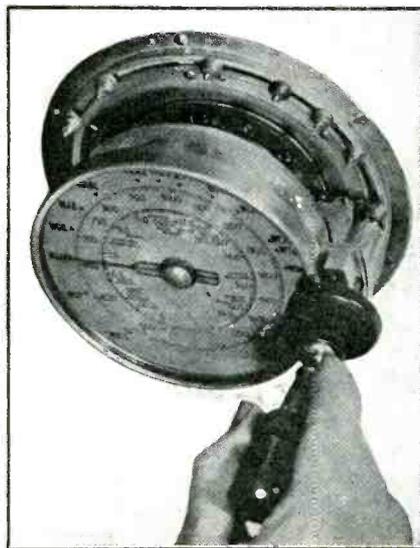
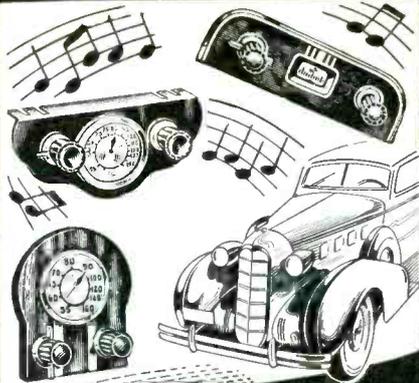
THE 1938 Philco "Cone-Centric" models employ a unique dial arrangement as shown in Fig. 1. Fifteen cones are used to locate as many stations. These stations may then be accurately tuned by a slight twist of the wrist.

A special local dial card is furnished with these models to facilitate presetting the cones for the particular local stations available. A station-stop wrench (part No. 45-2475) is also required.

INSTALLING LOCAL DIAL

Remove the tuning knobs from the station selector arm. The knobs are held in position by a special knob screw which has a screwdriver slot in the end. To remove the knobs separate them and hold the shaft with a pair of pliers. It is important that the pliers hold the shaft between the knobs to prevent damage to the spring which disengages the slow-speed tuning knob. The knob screw can be removed while

*Courtesy Philco Radio & Television Corp.

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GENERAL DATA—continued

holding the shaft with the pliers. Remove the small screws on either side of the station selector knobs and take off the station stop cover.

Press the knurled bezel, turn counter-clockwise and remove.

Remove the station finder hand by drawing it straight out and away from the radio chassis. This hand is keyed in its correct position and is pressed on to the end of the shaft. Be sure to draw it straight away from the set. The hand should *not* be turned as it is removed.

Remove the round dial retaining spring. Remove the dial card furnished with the receiver. Replace with the special local dial card furnished. The proper position is fixed by an index.

Place the round retaining spring over the dial edge.

Replace the finder hand and the bezel. Replace the knobs but not the cover plate.

METHODS FOR PRESETTING CONES

The receiver as originally shipped has the cones closely placed together at the right side of the dial. They may be set for the particular stations in any one of several ways depending upon the equipment that the Service Man has available.

The simplest method of determining the positions at which the cones should be preset is by tuning in the particular stations to resonance, using a tuning eye, shadowgraph, vacuum-tube voltmeter or similar device connected to the avc returns, as resonance indicator. A more accurate method of indicating resonance, however, is to zero-beat the normal i-f signal resulting, with the unmodulated r-f signal from a typical signal generator (such as the Philco Station-Setter) or with any other pure r-f signal which can be tuned in the neighborhood of 470 kc (such as a short-wave beat oscillator).

PRELIMINARY PROCEDURE

The receiver should be turned on and set for operation on the broadcast band. The receiver is tuned to approximately 540 kc and the volume control set about half way on. The tone control should be in the normal position.

The signal generator is set for operation at approximately 470 kc. The modulation should be removed from the generator signal by the means provided. The generator attenuator should be turned on full.

Both receiver and generator should be allowed at least 15 minutes to warm up before adjustments are attempted.

The output lead of the generator is



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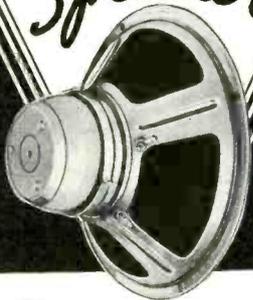
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GENERAL DATA—continued

clipped to the insulation on the wire that is soldered to the middle section of the tuning condenser gang on the model 4. On the model 7, the generator lead is clipped to the insulation on the wire that is soldered to the rear section (nearest the back of the radio) of the tuning condenser. Connect the generator ground lead to the receiver chassis.

As the tuning indicator of the signal generator is rocked in the vicinity of 470 kc a hiss will be heard in the loud-speaker. As the tuning indicator passes 470 kc there will be two pronounced peaks with a minimum position between. The generator signal should be adjusted to the point of minimum hiss between the two peaks.

Connect an aerial to the receiver in the usual manner.

PRESETTING THE CONES

The station nearest 1500 on the dial scale must be aligned first. The next stop is used for the station next lower in frequency and so on for the rest of the stations.

Rotate the dial handle to the right until it is directly over the first stop. Press the knob to engage the stop. Holding the knob in this position, insert the special wrench (mentioned above) in the hole of the tuning knob until it engages the stop screw head (see Fig. 1). Turn the wrench counterclockwise to loosen the screw.

When the screw is loose rotate the handle until the station finder hand is at the station desired. Care should be taken to keep the handle and wrench engaged with the station stop so that the stop is moved along its track to the position it is to occupy for automatically tuning the station.

As the station finder hand approaches the desired station a whistle will be heard—first very shrill and then gradually getting lower in frequency as the station is tuned in. When the whistle is heard the slow speed station selector knob should be used for further tuning.

At the exact point at which the station is perfectly tuned this whistle will no longer be heard. This is the point at which the station indexing stop must be locked.

When this point is reached turn the wrench clockwise and lock the stop in position. Care must be taken in tightening the screw to prevent detuning the station. The whistle should not reappear while the screw is tightened. If the whistle reappears the screw should be loosened again and the stop returned for zero-beat.

The remaining stops can be set similarly. The station-stop cover may be replaced.

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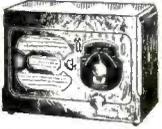
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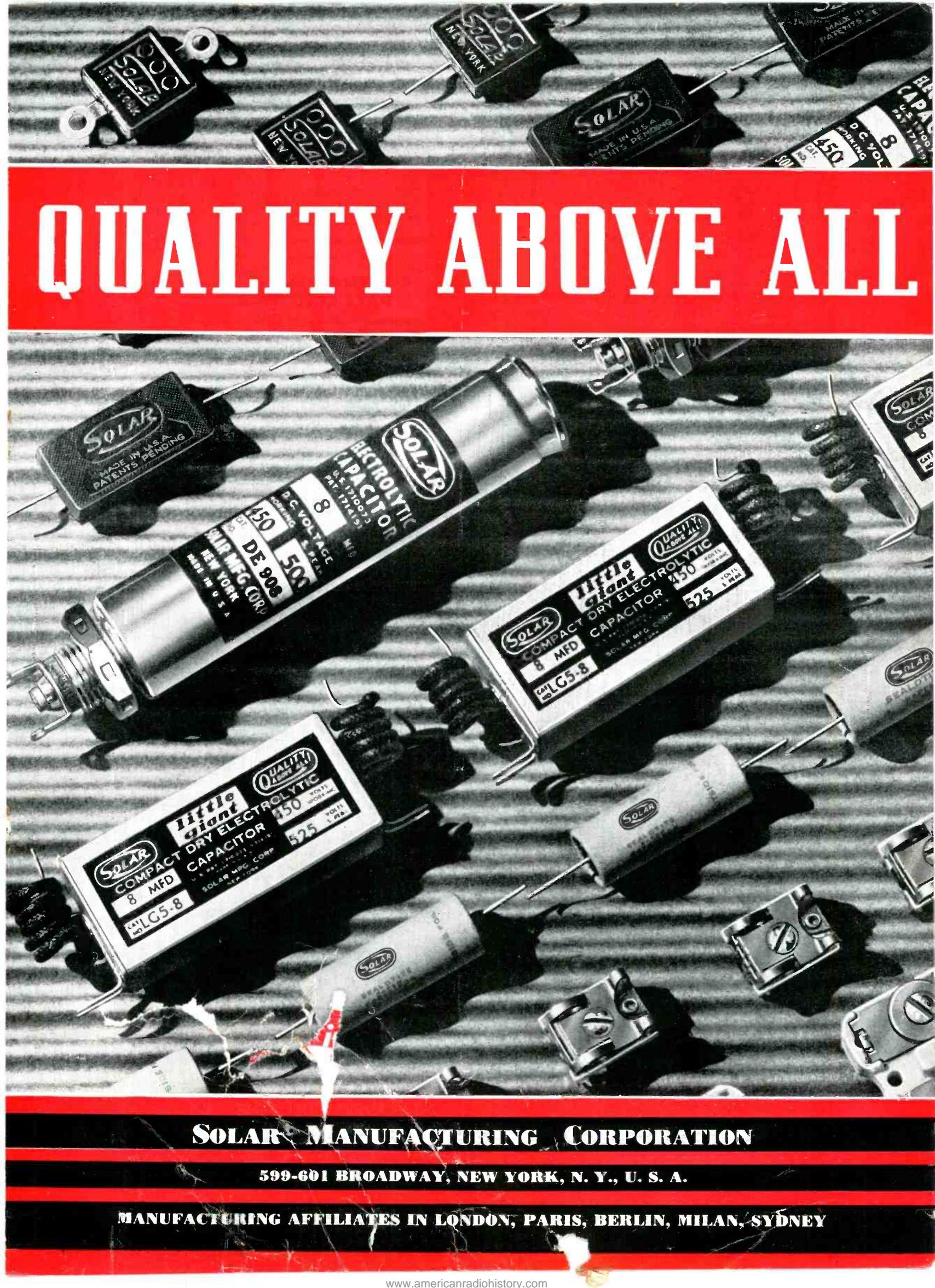
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