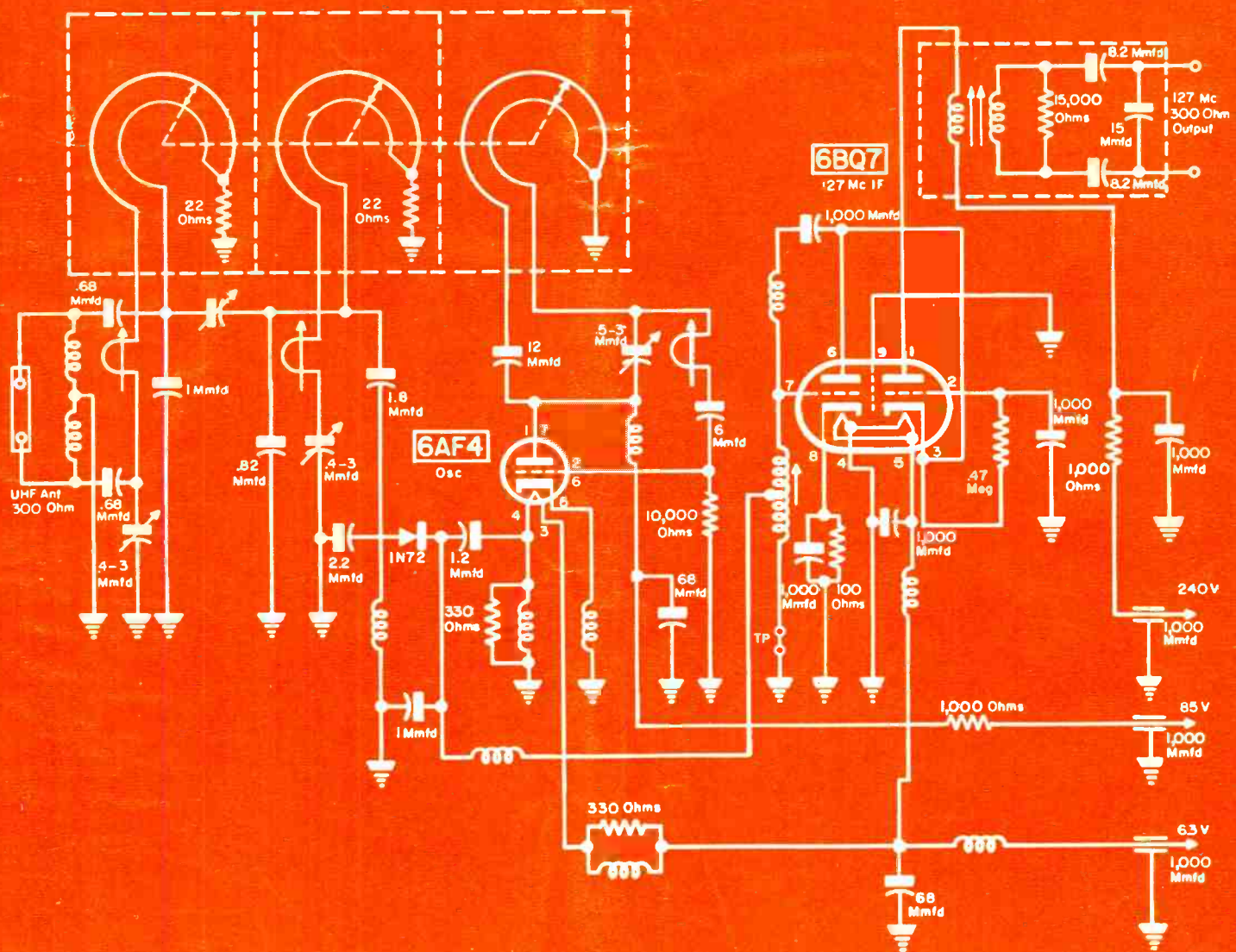
RADIO • TELEVISION • ELECTRONIC

SERVICE

JULY
1952



Uhf-vhf variable-inductance input for all-channel chassis.

[See page 2]

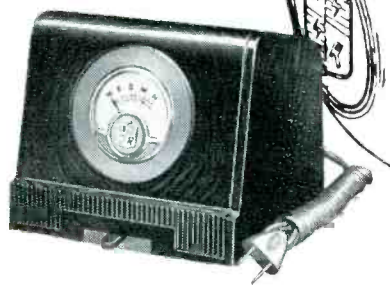
Here's Why— the CDR Rotor

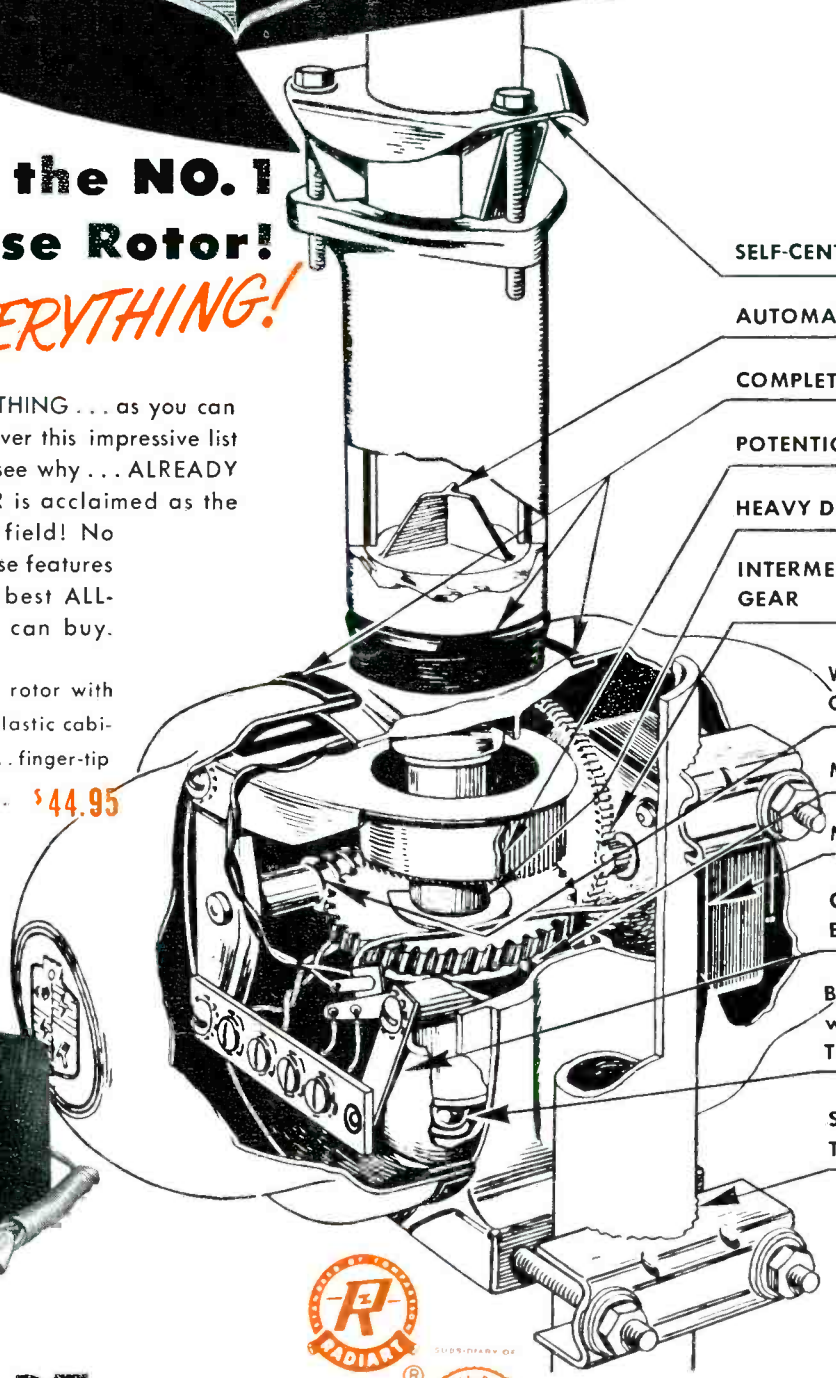
...Is the NO. 1 all-purpose Rotor!

It has EVERYTHING!

And it does have EVERYTHING . . . as you can plainly see! Just check over this impressive list of features—and you'll see why . . . ALREADY THE NEW CDR ROTOR is acclaimed as the outstanding unit in the field! No other rotor boasts all these features . . . that's why it's the best ALL-PURPOSE rotor money can buy.

MODEL TR-11 Complete rotor with handsome modern design plastic cabinet and meter control dial . . . finger-tip lever—using 4 WIRE CABLE.. **$44.95**





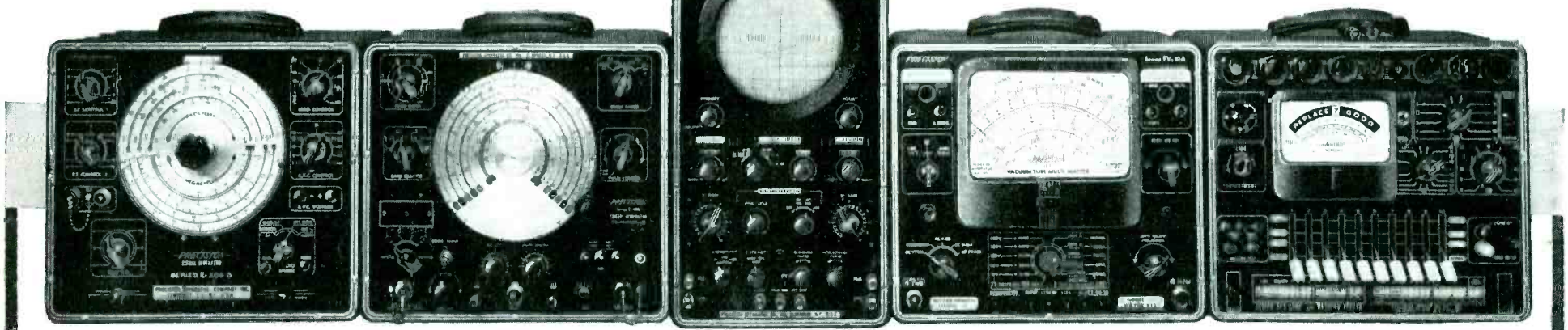
THE RADIART CORPORATION
CLEVELAND 13, OHIO

CORNELL-DUBILIER
SOUTH PLAINFIELD, NEW JERSEY

★Build Your Service-Sales Future on a Firm Foundation with . . . .

PRECISION
TEST EQUIPMENT
Standard of Accuracy...

. . . These 5 Matched "Precision" Instruments provide a Complete MODERN SERVICE LABORATORY for TV-FM-AM at only moderate cost.



SERIES E-200-C — Modern Multi-Band SIGNAL and MARKER GENERATOR for A.M., F.M., and TV alignment.

Exceptional Accuracy and Stability! 1000 pt. vernier calibrating scale! 0-100% Modulation! A.V.C. — A.G.C. substitution-override network! Direct reading 88KC to 120 MC! Complete with Coaxial output cable and technical manual! In matched, heavy gauge steel case 10½ x 12 x 6".

Net Price: $73.25

SERIES E-400 — Wide Range H.F. SWEEP SIGNAL GENERATOR Direct Reading from 2 to 480 MC.

Narrow and Wide Band Sweep for F.M. and TV, 0-1MC and 0-15MC • 1500 pt. vernier calibrating scale • Multiple Crystal Marker • 8 tubes including V.R. and rectifier • RG/62U Coaxial Terminated Output cable • Complete with 2 crystals • In matched copper-plated case 10½ x 12 x 6".

Net Price: $135.75

SERIES ES-500A — 20 MV. High Sensitivity, Wide Range 5" C.R. OSCILLOGRAPH.

Push-Pull "V" and "H" amplifiers • 1 MC Band Width • High impedance, compensated "V" input Step Attenuator • Z axis modulation • 12 tubes incl. V.R. and 2 rect. • Light Shield and Mask • Heavy Steel Case. 8¼ x 14½ x 18".

Net Price: $173.70

SERIES EV-10A — High Sensitivity True Zero-Center VTVM—MEGOHMMETER — with large 7" meter.

58 ranges to 6000 Volts, 2000 Megs, +70DB, 12 Amps • Direct Reading R.F. VTVM scales via optional RF-10A High Freq. probe • Voltage Regulated bridge type circuit • Constant 13⅓ Megs input resistance to 600 V. 133⅓ Megs at 6000 V • Complete with test cables and manual • Matched heavy gauge steel cabinet 10½ x 12 x 6".

Net Price: $97.20

SERIES 612 — Modern Free-point Cathode Conductance TUBE TESTER, and dynamic A-B-C Battery Tester.

Incorporates RTMA recommended circuit principles! 10 lever free-point element selection! Built-in roller chart! Dual short-check sensitivity! Noise, Ballast and Pilot Tests! Free replacement tube test data chart service! Complete, ready to operate! In matched heavy gauge steel cabinet 10½ x 12 x 6".

Net Price: $72.75

BUY PERFORMANCE—NOT SPECIFICATIONS!—BUY *"PRECISION"*

"PRECISION" PERFORMANCE, ACCURACY, WORKMANSHIP and VALUE have been setting a standard of comparison for over 19 years. . . . . DO NOT BE MISLED. . . . . It is not "PRECISION" test equipment unless it is manufactured by Precision Apparatus Co., Inc., Elmhurst, L. I., N. Y.

"Precision" Performance - Engineered Instruments are on display at leading radio parts and equipment distributors.

OTHER MATCHED COMBINATIONS

The instruments shown above illustrate one of many possible MATCHED COMBINATIONS of diversified *"PRECISION"* Test Equipment for TV-FM-AM. Each combination provides a selected and basic, modern, efficient Laboratory at moderate cost.

SERIES TV-4 — Super-High Voltage Safety Test Probe.

Extends range of Series EV-10A (above) to 60 KV direct reading, with full safety to operator and equipment. Multiplier cartridges also available to match most VTVM's and 20,000 ohms/v. test sets.
Series TV-4: — Complete, for use with EV-10A.

Net Price: $14.75

PRECISION APPARATUS CO., INC.

92-27 Horace Harding Boulevard, Elmhurst 6, New York

Export Division: 458 Broadway, New York, U.S.A. • Cables—Morhaney

In Canada: Atlas Radio Corp., Ltd., Toronto, Ontario

Convenient "Precision" Purchase Terms can be arranged with your favorite authorized Precision Distributor.

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Vol. 21, No. 7

RADIO · TELEVISION · ELECTRONIC
SERVICE

July, 1952

LEWIS WINNER
Editor

F. WALEN
Assistant Editor

Registered U. S. Patent Office
Including *Radio Merchandising* and *Television Merchandising*

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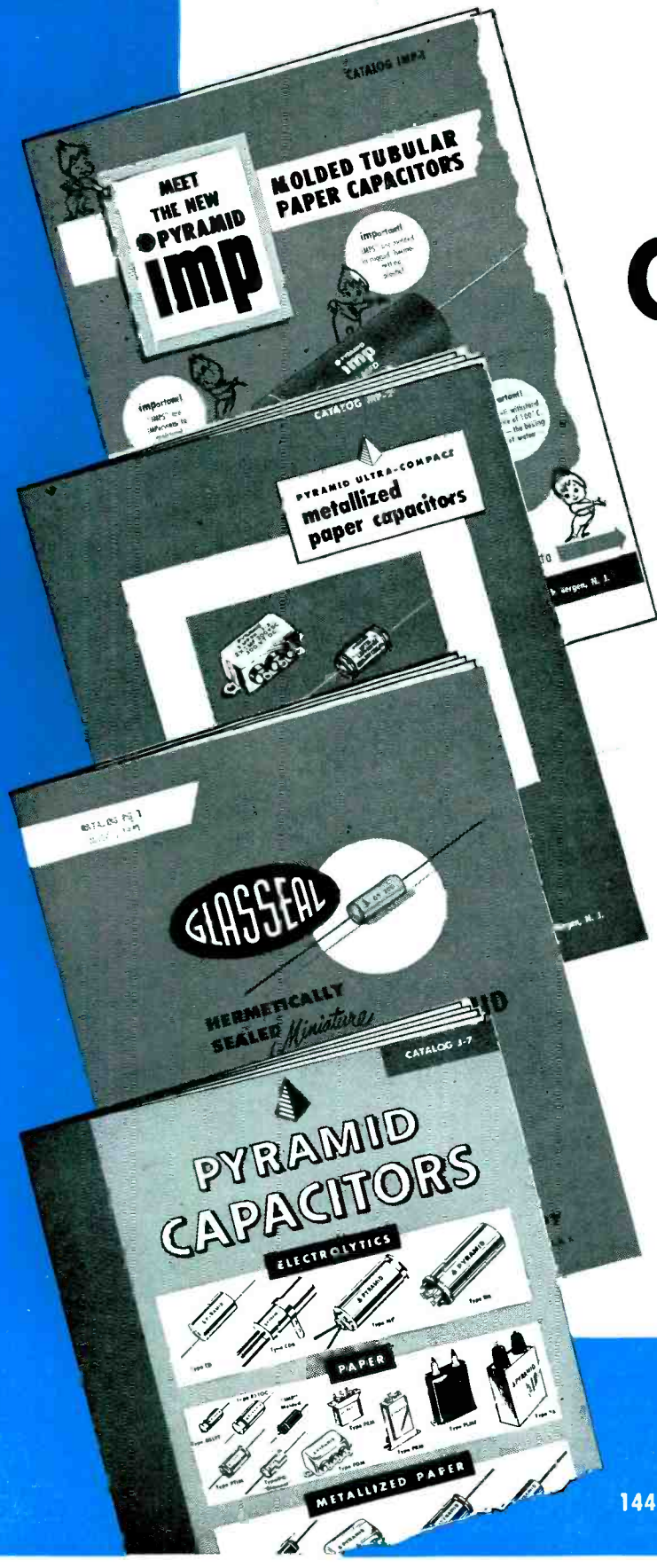
Entered as second-class matter June 14, 1932, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Subscription price: $2.00 per year in the United States of America and Canada; 25 cents per copy. $3.00 per year in foreign countries; 35 cents per copy.

Yours for the asking...

this new set of

PYRAMID CAPACITOR *catalogs!*



CATALOG IMP-1 describes Pyramid's new line of molded plastic tubular capacitors. "IMPS" are rugged — impervious to moisture and withstand a temperature of 100° C.

CATALOG MP-2 gives detailed information on ultra-compact metallized paper capacitors. Minimum size and weight, and self-healing qualities are characteristics of these units.

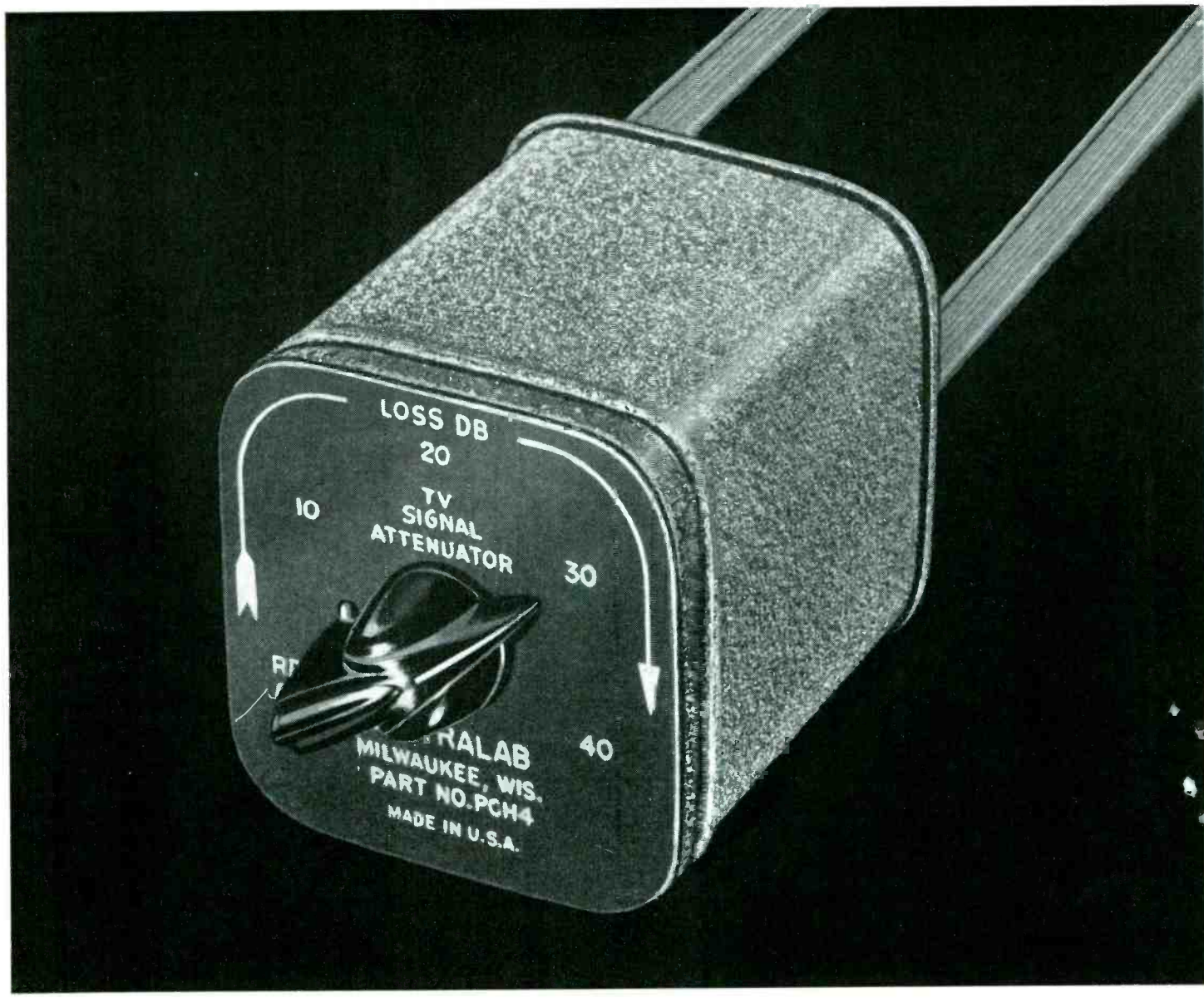
CATALOG PG-1 lists miniature Glasseal capacitors. These tubular units perform at temperatures ranging from −55° C. to +125° C.

CATALOG J-7 is a 32-page compilation of paper, electrolytic, oil-paper and metallized paper capacitors. Complete data on eighteen different types, including construction variations, sizes and prices are listed.

Free copies of these colorful, attractive publications are available on letterhead request to Dept. S1

PYRAMID
ELECTRIC COMPANY
1445 Hudson Boulevard, North Bergen, New Jersey

NEW CENTRALAB
eliminates "cut and try"



TV service men will welcome this new Centralab Attenuator Switch. It's especially useful where a television set is located too close to a broadcast station. Or if a set is in an area served by several stations, it helps correct a high-power situation—where one signal is too strong in relation to other stations.

The Centralab Attenuator Switch quickly matches the signal strength to the requirements of the receiver. You can then install an H-Pad quickly . . . achieve optimum performance.

SERVICE TOOL
methods of installing H-pads

New TV Attenuator Switch saves you testing time . . . assures no overloading of sets

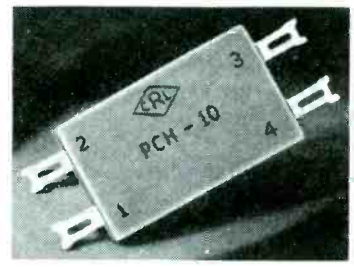
HERE'S a new Centralab service tool that will save you time determining the exact amount of attenuation required to get the best TV reception.

Four different H-Pads are mounted permanently in the attractive metal case of Centralab's Attenuation Switch. You simply hook up the 300 ohm antenna twin-lead . . . and turn the dial to the H-Pad that gives you the proper amount of attenuation. Then unhook the leads and install the proper H-Pad. Takes only a few minutes for the entire installation.

More, if you have customers who want a permanent installation with selective attenuation, this switch is ideal. A convenient bracket is available to facilitate mounting the switch in back of the cabinet.

Your Centralab distributor will be glad to give you full specifications on this handy, time-saving service tool — as well as the Centralab H-Pads described below. See him today, or use the handy coupon below.

FOR BEST PERFORMANCE AND ATTENUATION, use the handy Centralab P.E.C. television H-Pads. They can prevent overloading, eliminate tearing of the image, improve both audio and video results. Also useful in matching impedence between the antenna and the receiver. Available in 10, 20, 30 and 40 db. H-Pads install in series with the standard 300 ohm antenna.



Centralab
A Division of GLOBE-UNION INC.
908 E. Keefe Avenue • Milwaukee 1, Wisconsin

CENTRALAB 30th Anniversary A Div. of GLOBE-UNION Inc. 1922 1952

CENTRALAB, A Division of Globe-Union Inc.
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☐ Please send me additional technical information on the new Centralab TV Attenuator Switch.

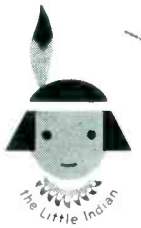
☐ Send information on TV H-Pads.

Name..... Position.....

Company.....

Address.....

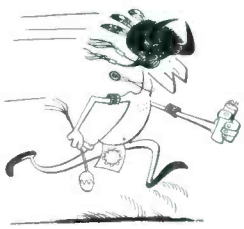
City..... Zone..... State.....



you know you're right when you service with

SANGAMO "Twist-Tab" Replacement Capacitors

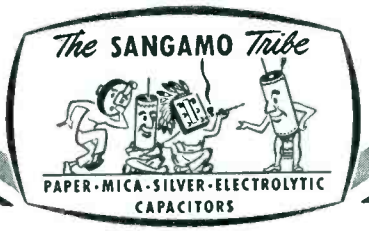
Sangamo Type PL Dry Electrolytics are used as original equipment by *all major* TV set manufacturers



Here's "good medicine" for ailing TV sets (and servicemen's headaches, too)! Sangamo "Twist-Tab" (Type PL) Electrolytics are *exact* replacements —they assure long life and dependable performance at 85° C. and under conditions of high surge voltages and extreme ripple currents often found in TV applications.

"Twist-Tabs" are compact, light in weight and easy to mount. They are used by leading TV manufacturers . . . and they are available from the largest listing of capacities and voltages available in the industry.

Ask your distributor for a copy of the Sangamo TV Replacement Catalog. It's easy to use and helps you choose the *right* replacement every time.

Those who know 

...choose Sangamo

SANGAMO ELECTRIC COMPANY

MARION, ILLINOIS

SC52-8

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102 BILLION

FREE SALES BOOSTS A YEAR FOR YOU!

NEW
CBS-HYTRON
BRAND
gives you:

Acceptance

1,973,326,000 times a week! 102,612,952,000 times a year! The magic letters "CBS" are seen and heard on radio and TV station breaks. Impact is terrific. An average of 13 sales impressions weekly for every man, woman and child in the country. Every one of your customers knows CBS. Knows he can depend upon CBS. Consumer acceptance of your CBS-Hytron brand grows hourly.

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As a division of the Columbia Broadcasting System, Inc., CBS-Hytron commands tremendous engineering resources for you. Because CBS embraces the field of electronic entertainment: Radio broadcasting. TV broadcasting. Radio, television, and phonograph sets. Records. Electronic research laboratories. And CBS-Hytron tubes.

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For example, CBS-Hytron originated: the GT tube . . . the subminiature tube . . . the rectangular picture tube . . . specialized, low-cost TV receiving tubes. CBS-Hytron's new picture-tube and miniature-tube plants are the most modern in the world. Such aggressive leadership guarantees you the newest and best in tubes.

YOU CAN'T BUY BETTER

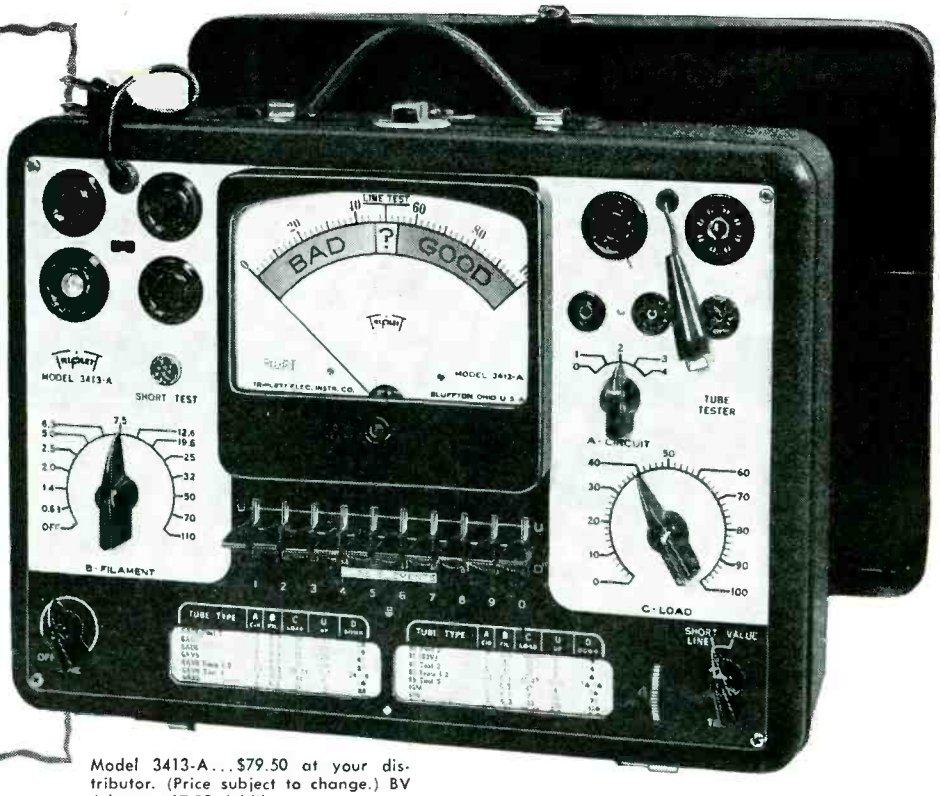
Demand the CBS-Hytron brand. You get the finest electron tubes that progressive engineering skill and craftsmanship can make. You get the brand known and respected by every one of your customers. **You get the brand they see and hear the most . . . CBS-Hytron.**

MANUFACTURERS OF RECEIVING TUBES SINCE 1921
HYTRON
RADIO AND ELECTRONICS CO.
A DIVISION OF COLUMBIA BROADCASTING SYSTEM, INC.

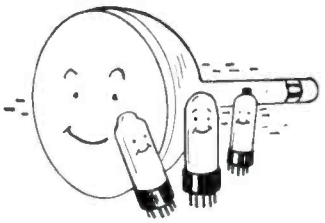
CBS HYTRON RADIO TUBES

MAIN OFFICE: SALEM, MASSACHUSETTS

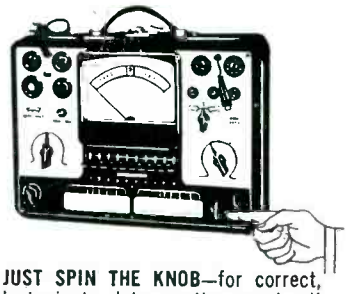
For accurate flexible and quick tube testing at low cost... model 3413-A



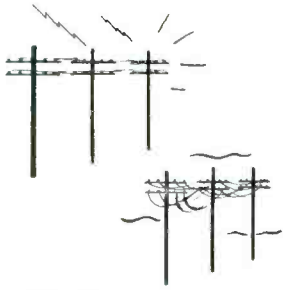
Model 3413-A...$79.50 at your distributor. (Price subject to change.) BV Adapter, $7.90 Add'l.



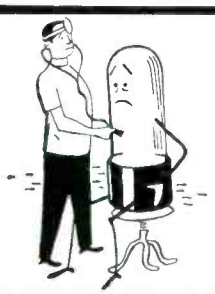
1. **YOU CAN TEST MORE TYPES** of tubes, also appliances for shorts and open circuits.



2. **JUST SPIN THE KNOB**—for correct, last-minute data, on the speed roll chart. Lists 700 tubes.



3. **YOU CAN COMPENSATE** for line voltage—just throw snap-action switch.

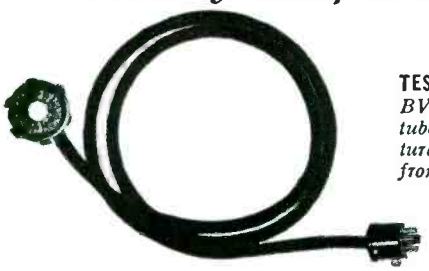


4. **YOU CAN TEST EACH ELEMENT** in each tube—by a simple flip of the switch.

5. **YOU CAN TEST THE NEW TUBES**—including those with low cathode current.

6. **YOU GET NEW TUBE DATA**—immediately, while it is still news. No waiting.

Nearly Half a Century of Service to the Service Man



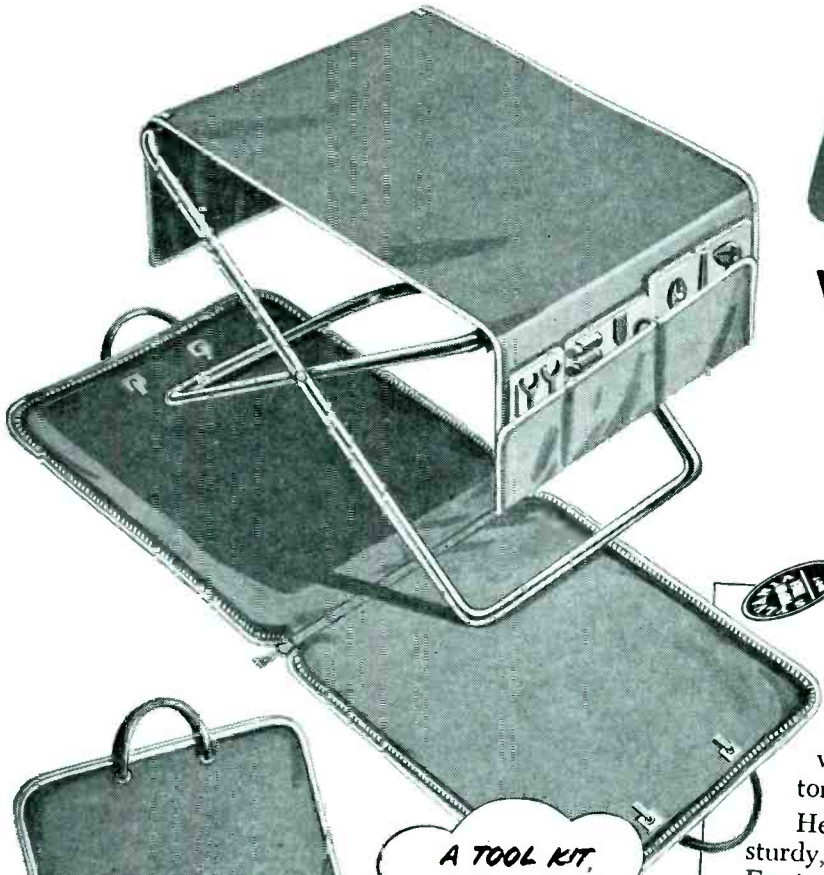
TESTS PICTURE TUBES, TOO! *With this BV Adapter, Model 3413-A tests every tube in a TV receiver,* including *the Picture Tube—without even removing tube from receiver or carton! Saves time!*

FOR THE MAN WHO TAKES PRIDE IN HIS WORK

Triplett

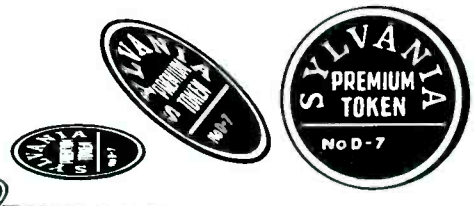
TRIPLETT ELECTRICAL INSTRUMENT CO., BLUFFTON, OHIO, U. S. A.

Don't miss Sylvania's unbeatable 3-way Service Helper—"SIT-'N-FIXIT"



FREE

WITH 16 SYLVANIA PREMIUM TOKENS



Entire kit folds into a neat compact carrying case.

Sylvania now offers you the world's handiest and most complete servicing kit. Nothing else like it! It'll speed your work, spare your back, impress your customers!

Here, in a neat sail-cloth carrying case, is a sturdy, aluminum and canvas, folding stool. Equipped with zippered pocket for tools and parts. Also open pockets for Sylvania Wrench Kit and Pliers Kit. And get this! The unzippered case opens out to a broad, turned-up-edge drop-cloth.

How to get your "Sit-'N-Fixit"

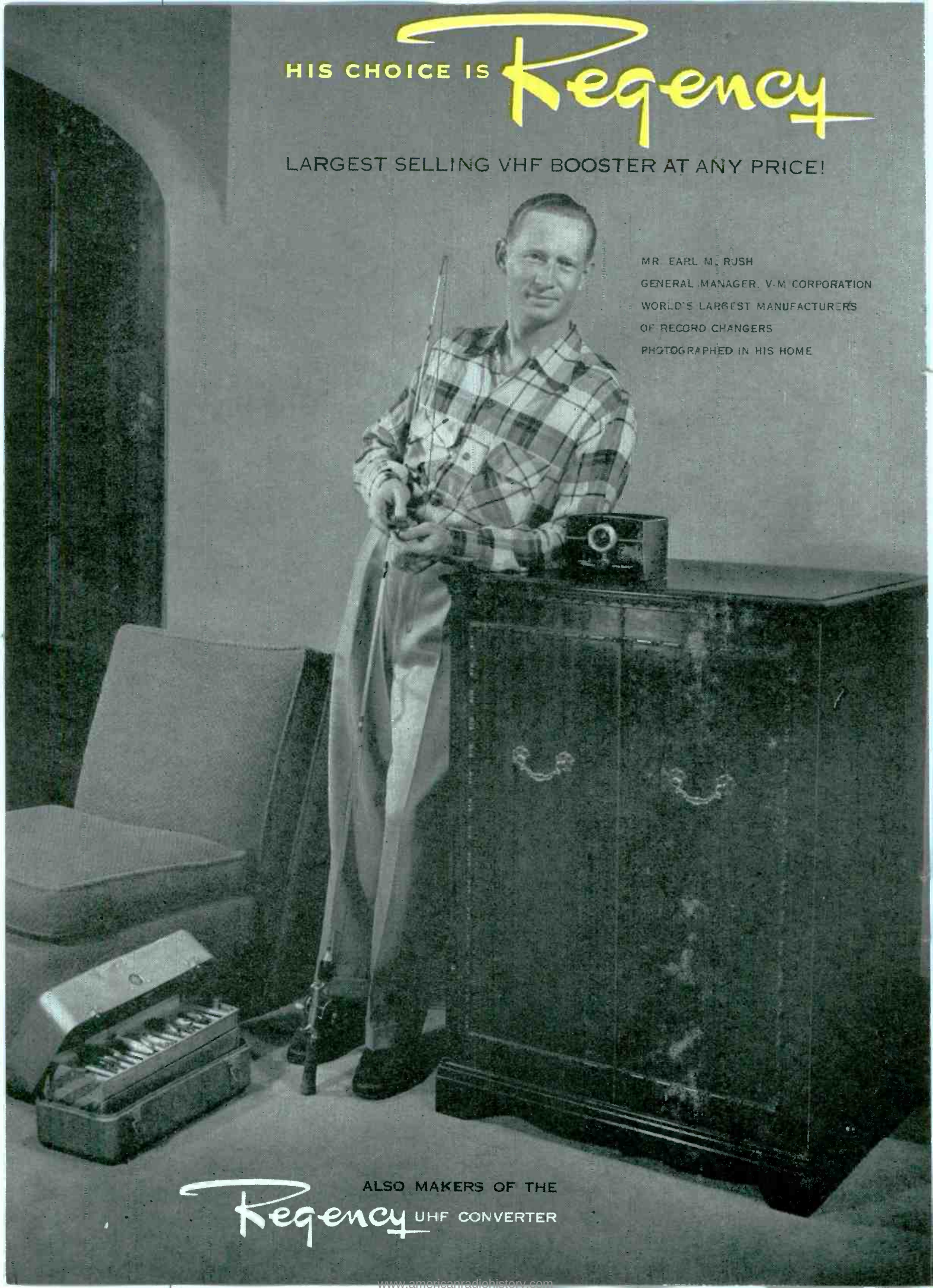
You get this complete servicing kit FREE for only 16 Sylvania Premium Tokens shown above. One of these tokens is yours free with every Sylvania Picture Tube or with every 25 Sylvania Receiving Tubes purchased from your distributor. When you have 16 tokens, take them to this distributor and pick up your "Sit-'N-Fixit." *Note, these tokens will be honored only by the one distributor where you buy all your tubes.*

Don't delay

This is a special summer offer. Good only from July 1st to August 31st. So, call your Sylvania Distributor and get in those tube orders TODAY!

SYLVANIA

RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC PRODUCTS; ELECTRONIC TEST EQUIPMENT; FLUORESCENT TUBES, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; PHOTOLAMPS; TELEVISION SETS



For the clearest picture of campaign progress...

Rauland PICTURE TUBES

Man, what a year for TV—and TV service profits! The richest menu of regular attractions ever offered to viewers . . . PLUS the party conventions, the campaign, the elections and inauguration! When viewers need replacement picture tubes, they'll want them fast—*and good.*

So remember that Rauland alone offers these replacement profit advantages:

- The *most complete* line of replacement picture tubes . . . a far better supplement for your regular tube line than a second line of receiver tubes.
- The faster, *surer* installation adjustment made possible by the patented Indicator Ton Trap.
- The dependable, uniform *extra* quality that so many smart service men depend on for assured customer satisfaction.

• • •

Remember, Rauland research has developed more "firsts" in picture tube progress since the war than any other maker. And this leadership pays off . . . in your customers' satisfaction.

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Perfection Through Research

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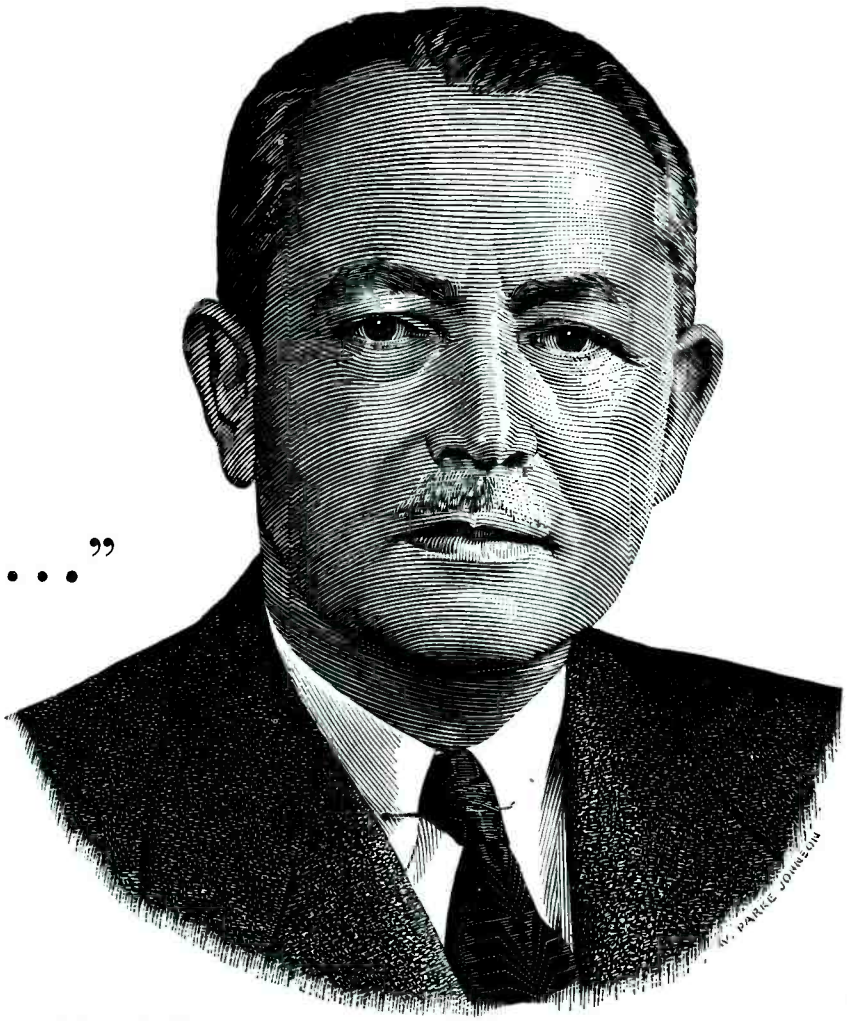
"... opportunity is freely given..."



PAUL M. HAHN
President, The American Tobacco Co.

"Our nation has grown great largely because opportunity is freely given. Only very few people actually make their own 'breaks.' Today, millions of Americans are providing for their personal financial security and at the same time helping in the building of our national defenses. The opportunity to do so is given by business management which affords employees the means of practicing systematic thrift through the Payroll Savings Plan for the purchase of U. S. Defense Bonds."

Nearly seven million employees of industry are "providing for their personal security and at the same time helping in the building of our national defenses."

- they are the men and women who availed themselves of the opportunity referred to by Mr. Hahn—the opportunity to enroll in the Payroll Savings Plan for the systematic purchase of U.S. Defense Bonds.
- they represent a high percentage of their companies' employees—in plant after plant, the averages are climbing to 60%, 70%, 80%—even higher.
- their investment in Defense Bonds—and America—add up to $140 million per month.
- they constitute a large block of the men and women who on December 31, 1951, held Series E Bonds amounting to $34,727,000,000—$4.8 billions more than the cash value of Series E's outstanding in August, 1945.

Not far from you is a State Director of the Savings Bond Division. He will be glad to tell you how easy it is to give your employees a Payroll Savings Plan. Or, if you already offer the Plan to your people, he will show you how to conduct a simple person-to-person canvass of your plant—a canvass intended to do only one thing—to put a Payroll Savings Application Blank in the hands of every man and woman on your payroll. Your employees will do the rest.

Phone or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C.

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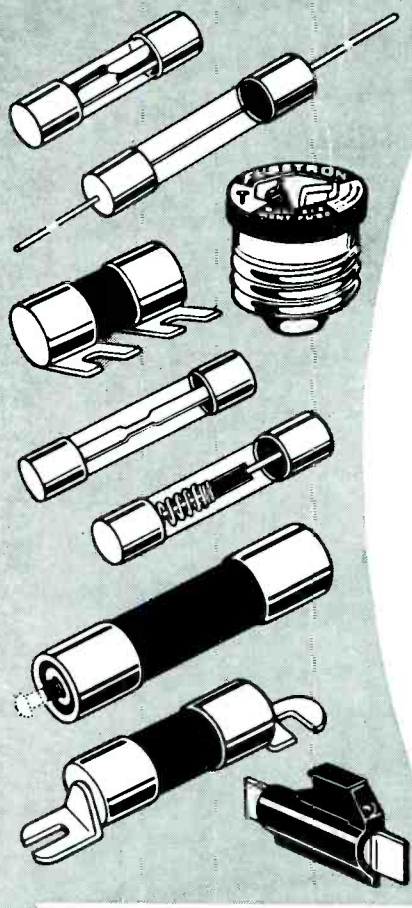


Here's How

BUSS FUSE "Know How" *Helps* Protect Your Reputation

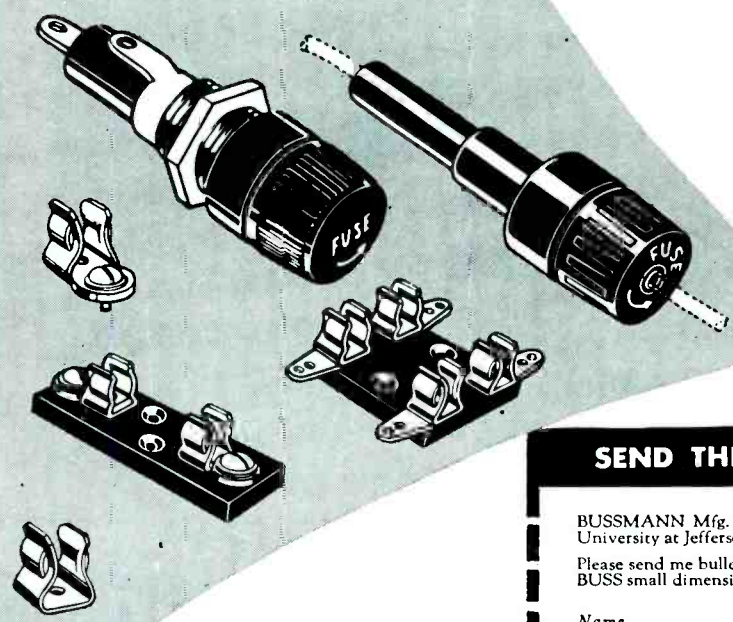
The BUSS Fuses you buy today are the result of the production of millions upon millions of BUSS Fuses during the past 37 years. These years of specializing have taught BUSS engineers how to make fuses of unquestioned high quality — and still maintain a competitive price.

Behind the established reputation of BUSS Fuses is the world's largest fuse research laboratory and the world's largest fuse production capacity.

To make sure that a BUSS Fuse will always operate properly under service conditions . . . each and every BUSS Fuse is tested in a highly sensitive electronic device that records: — the fuse has the right capacity, is properly constructed and right in all physical dimensions.

These important safeguards build customer goodwill. That's why you can handle BUSS Fuses with complete confidence — you know you will have no irritating and costly "come-backs". It pays to standardize on BUSS Fuses.

BUSS offers a complete line of fuses for Radio • Television • Controls • Avionics • Radar • Instruments • PLUS a companion line of fuse clips, fuse blocks and fuse holders.



BUSSMANN MFG. CO.
University at Jefferson St. Louis 7, Mo.
Division of McGraw Electric Company

SEND THE COUPON FOR COMPLETE FACTS

BUSSMANN Mfg. Co. (Division of McGraw Electric Co.)
University at Jefferson, St. Louis 7, Mo.

Please send me bulletin SFB containing complete facts on BUSS small dimension fuses and fuse holders.

*Name*_____

*Title*_____

*Company*_____

*Address*_____

*City & Zone*_____ *State*_____ S-752

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RADIO · TELEVISION · ELECTRONIC
SERVICE

The Rousing Auto-Radio Market

CAR SETS, once described as a silken luxury which would be of interest to a very few, have certainly romped out of that lonely pit during the past few years, with millions and millions becoming enthusiastic set owners every year.

In 1950, according to the Department of Commerce, over 20-million cars had auto radios. In '51, according to a broadcast survey, nearly 25-million cars were equipped with auto radios, or nearly double the number that existed five years ago.

Probes have indicated that this striking rise in set ownership will continue not only for passenger cars, but for commercial vehicles, too, with between 60 and 65 per cent of the car owners installing sets. Present records show that California, New York and Pennsylvania lead in the number of vehicles registered, close to 12 million, and housing auto radios.

Broadcasters have become more conscious than ever of this expanding audience, not only because it highlights the virtues of listening while en route, but because it also sells continually the entertainment and informative value of radio broadcasting. . . . two factors which have also been of significance to enterprising Service Men who have found that people listen more and more and are more anxious than ever to have their receivers serviced to assure good listening.

The Booming Campaign Era

WITH THE HISTORIC election months ahead, a sprightly period of profitable activity is on the horizon for every Service Man. Viewers and listeners, too, will be more anxious than ever to see and hear. They'll want their sets to be sharp and in readiness for the exciting months ahead.

Alert Service Men are ringing doorbells, dialing away, and mailing reminders that they can insure perfect performance during the coming months. Following a pattern of one leading manufacturer, some Service Men are sending out bulletins, letters and post cards, announcing 10-point tune-up plans available at a moderate price. Among the items included in the tuneup schedule are: Inspection of leadin and connections, for mechanical and electrical efficiency; adjustment of all rear-chassis controls to assure maximum picture linearity; adjustment of receiver focus for maximum brilliance and sharpness; checking of picture to assure maximum height and width, with good linearity; checking of range of all front controls and adjustment of the fine tuning range for maximum picture and sound quality; adjustment of the horizontal-hold system for maximum performance, all supplemented with an accurate written report of inspection and the general operative condition of the receiver.

As one chassis maker has said, *now is the time to* . . . "Make your shop *campaign* headquarters for listening and viewing service."

Are Flat Rates for Service Equitable?

FOR YEARS industry has studied the pros and cons of standardized rates for servicing, with many considering the patterns being used in automotive service manuals.

In some areas, associations have attempted to solve the problem with suggested rate charts. However, because of varying overhead expenses[1], including rent plus test equipment, inventory and traveling expenses; insurance, salary, and training costs, it has been found difficult to set rigid industry-wide national standards.

Shop owners have used broad base standards and adjusted their rates of income according to operational expenses, striving to set an income level that would provide a just reward for their efforts. At the request of some, the Office of Price Stabilization has now been called in to consider the scrapping of this flexible program, and the setting up of a fixed-rate schedule which might be included within a supplementary regulation and amended to the existing CPR-34. Fortunately, OPS officials have questioned the soundness of such a procedure, indicating that the radio and TV service industry has never had a flat-rate manual, and it might not be possible to develop such manuals because of a lack of time-study data, amortization cost information, and other sundry details.

In the opinion of many, government rate schedules would be entirely out of order, for it would create severe hardships, binding many to inequitable price ceilings, and imperil the operation of most shops.

Here is a vital problem of concern to every Service Man. What are your views on this critical subject? Send your comments to ye editor.

[1] *Business Aids*, SERVICE; February, 1952.

Truthfulness in Advertising

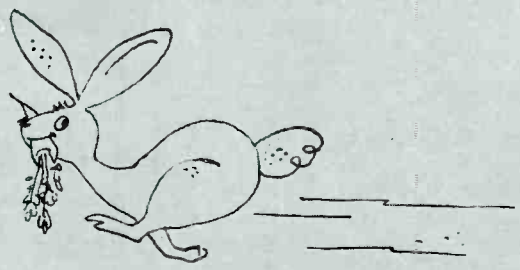
IN THESE COLUMNS, a few months ago, a charge of flagrant huckstering was hurled at a *few* who have repeatedly misfired in their advertising and sales promotion, to the chagrin of the Service Man, who has had to bear the brunt of criticism when the glamorized gear did not live up to the sensational claims advertised.

The vitriolic blast was prompted by the continued appearance of wild statements in the daily press and popular newsstand weeklies and monthlies, directed to millions of gullible consumers.

Unfortunately, the situation has not only distressed Service Men, but those pioneer component and accessory manufacturers who have always been forthright in their trade and consumer copy. Their calm, accurate commentaries, based on exhaustive studies and prepared by technical specialists, have won the admiration of industry. It is sincerely hoped that the sterling patterns in truthful advertising that they have established will be adopted on an industry-wide basis, and promptly!

The West Coast Conference

LONG BEACH, CALIFORNIA, will play host this year to the annual Pacific Coast Electronic Show and Conference, during which veryhigh and ultrahigh TV, color TV, and component design will be highlighted. A comprehensive report on this all-important event will be published in an early issue of SERVICE. Be sure to watch for it.—L. W.



FAST

KESTER "RESIN-FIVE" CORE SOLDER

FAST . . . On Every Soldering Job

Kester has two Solders for you . . . Kester "Resin-Five" Core Solder, the newest development, and Kester Plastic Rosin-Core Solder, the old reliable.

Either product, but especially "Resin-Five," does the work fast, enables you to get the job out quickly and make room for more of that profitable servicing.

With Kester "Resin-Five" Core Solder, the flux being of the activated Resin-type, you can solder anything and everything . . . even those badly oxidized parts! Yet, "Resin-Five" Flux is absolutely non-corrosive and non-conductive.

• Diameters of 1/16 inch and smaller available, besides the 3/32 inch.

Your Jobber has Kester! Be sure to ask for "Resin-Five" or "Plastic Rosin"... they are the genuine Kester products.

KESTER SOLDER COMPANY
4248 Wrightwood Ave., Chicago 39
Newark 5, New Jersey • Brantford, Canada

KESTER SOLDER

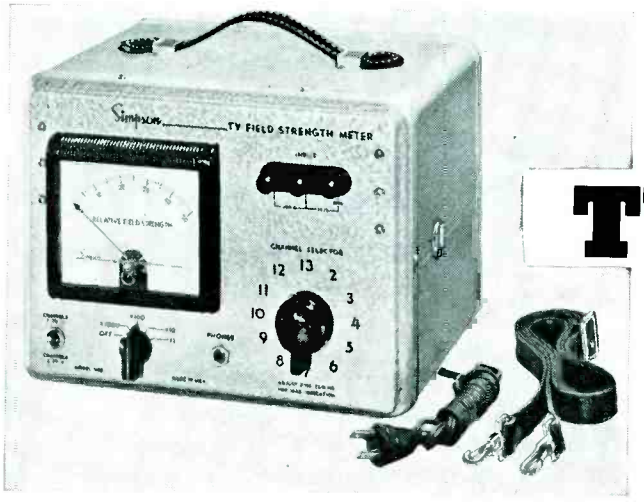
SERVICE...The National Scene

NPA GREENLIGHTS TV COLOR BUT DEFENSE NEEDS EXPECTED TO HALT SETMAKING--Notwithstanding the amendment to National Production Authority ruling M-90, removing the ban on color chassis making, it is believed that no red, blue and green sets will be produced because of the strict accompanying rules covering manpower, materials and production facilities. To qualify for set production, manufacturers will have to assure the government that such processing will in no way interfere with defense activities, employ any personnel required for defense research or manufacture, or use any supplemental allotments of controlled materials. NPA bluntly does not expect many producers to be able to qualify for permission to make color TV sets because of one acute problem, the shortage of engineers and technicians. Nobody in industry has been willing thus far to disclose if they will even apply for permission. According to one leading manufacturer, gearing up for mass production of color TV receivers would cause irreparable harm to defense production, requiring diversion of from 15-20 per cent of those engineers now engaged in strategic defense activities. . . . The possibility of renewed interest in color kits also disappeared, with the announcements that no active colorcast programming was now being considered. . . . The relaxation of M-90 is expected to generate more interest in color, and prompt increased research and development as manpower becomes available.

CALIFORNIA LEGISLATURE SLATED TO CONSIDER LICENSING BILL--A measure, No. 26, which would license everyone who services radio, TV or even phonos, introduced by Assemblyman Grant in the Spring of '52 before members of the California legislature, is expected to be considered early in '53, according to the chairman of the public relations committee of the Long Beach Radio Technicians Association in California. A board consisting of five appointed by the Governor would, according to the measure, conduct examinations for various classifications of Service Men, and be confined to such knowledge, practical-ability and skill . . . "as is essential in the proper installation and service of radio or TV receiving sets, or electronic record players." Fees for filing an application for registration as an apprentice will be $2, and $5 for Service Men. Annual fees of $2 and $5 for registration of apprentices and Service Men will also obtain. The annual license fee will be $25 for the first year and $15 thereafter.

CANADA BECOMES LIVELY TV MARKET--With the announcement that baseball telecasting would begin in late summer from CBC-TV in Montreal, and that the Toronto station would go on the air in September, TV interest has zoomed in Canada. Striking evidence of this enthusiasm appeared during the June town meeting of TV technicians, when over 425 appeared during a 4-day meeting conducted by Al Saunders and his staff who discussed horizontal and vertical sweep oscillators, sync separators, afc, video amplifiers and detectors, sound if amplifiers, agc, peak-to-peak voltage measurements and general troubleshooting. The meeting was so successful that plans for additional sessions are now being studied for possible fall and winter presentation.

BRIG. GEN. SARNOFF HONORED BY RTMA--For his outstanding contributions to industry, Brig. Gen. David Sarnoff was awarded recently the RTMA medal of honor. In making the presentation, Bob Sprague, former RTMA board chairman, said that the medal was not just another award, but . . . "a commendation from the men who have worked with him to make our industry great. . . . In literary circles, the writer's writer is one who learns new techniques in writing. General Sarnoff is the industrialist's industrialist in the radio-TV industry." . . . A stirring and well-earned tribute to one whose vision has contributed so strikingly to radio- TV- electronic progress.--L.W.



EFFICIENT TV-Installation Techniques

Fig. 1 (*left*). TV field-strength meter.

by JACK WHITESIDE and L. J. AUSTIN
Engineers, Simpson Electric Co.

Planned Shop and Field Installation Procedures, Featuring Use of Field Strength Meters and Signal Generators, Which Have Been Found to Insure Maximum Pickup in Local, Surburban and Remote Zones.

WHEN THE AVERAGE CUSTOMER buys a TV set, but two factors are normally considered most of the time; the attractiveness of the cabinetry and the potential results or entertainment value of the set. The Service Man must provide an installation which will be compatible with this new gadget and yet will not cause damage to property, or worse yet, to the landlord's property. In addition, the Service Man has an obligation to complete the installation without any undue delay or trouble, and to the complete satisfaction of the customer.

What Antenna?

One of the most important items in the installation is the antenna. Your own knowledge and experience with the locale will best answer the question as to what type of antenna is required.

The factors governing choice of antenna are signal strength, location, local ordinances, owner's restrictions (the customer may not own the property), and price. In strong signal areas, the built-in antenna *may* be sufficient. *However,* in the majority of cases, even in large metropolitan areas with transmitters close by, the type of building construction or the presence of ghosts, etc., can cause a simplified installation to lack the efficiency to which the customer is entitled. The use of a commercial indoor antenna (rabbit ears) or of a window antenna *may* overcome some of the shortcomings of the built-in-type. As the distance from the transmitter increases, the signal strength decreases and it becomes essential to choose an outdoor type antenna. If the building has a free attic space, the possibilities of the placement of the antenna inside the attic can be considered; some efficient installations have been performed with such an antenna, affording distinct advantages over outside installations, such as protection of the antenna from weather and lightning, simpler mounting requirements, and less physical danger to you, the installer.

If the antenna must be mounted high, it follows logically that it will be exposed to the effects of sun, wind, rain, snow, and ice. All-aluminum antennas are commonly used for outside installations. They come in a wide variety of shapes, but all have one common characteristic; they are directional with respect to the transmitter. Some type of orientation must be provided so that the antenna can perform its duties. The antenna can be oriented and then permanently fixed in position, or rotors can be installed so that the set owner can rotate the antenna to obtain the best reception for each channel as it is used. There are available *all-directional* type antennas, which permit one to select one of three to six combinations of element connections which will produce the best results. *But,* in all cases, there exists one problem; the selection of the position and basic element orientation which will give the optimum performance for the stations which will be received.

To anticipate the best location on the roof, as well as assist in orientation of the antenna, a *field strength meter,*[1] of the type illustrated in Fig. 1, can be used. It responds in terms of relative (as opposed to absolute) units of field strength for any of the twelve channels in commercial use. The basic idea of the *field strength meter* is to provide a portable receiver which will select and receive a tuned transmission signal, simulating the television receiver. Then, instead of applying the signal to the video amplifier and picture tube of the receiver (or to its sound channel and speaker), the instrument applies the signal to an indicating meter. The signal amplification is constant, and the indicated response of the meter is indicative of the relative field strength of the tuned signal. The intended antenna and leadin are connected to the input terminals of the portable meter, and the antenna may then be moved around until the best position is found, or several possible locations may be compared to obtain the best signal reception.

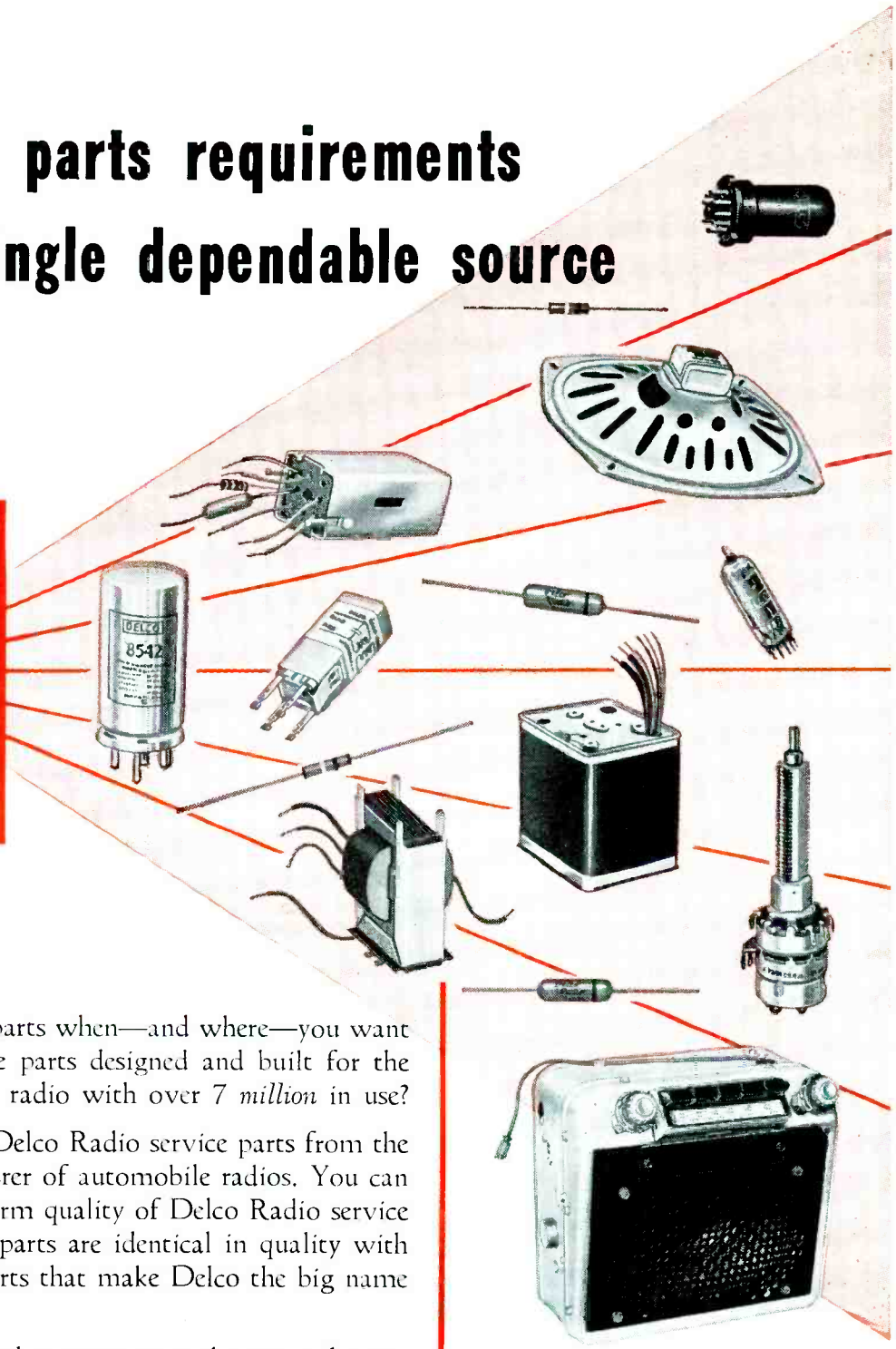
Although the device requires a 115-volt, 60-cycle power input to operate,

(*Continued on page 27*)

[1]Simpson 488.

Fill your parts requirements from a single dependable source

Delco Radio



Want *good* radio service parts when—and where—you want them? Want radio service parts designed and built for the world's most popular car radio with over 7 *million* in use?

If you do . . . you want Delco Radio service parts from the world's largest manufacturer of automobile radios. You can depend on the high, uniform quality of Delco Radio service parts. These replacement parts are identical in quality with the original equipment parts that make Delco the big name in car radios.

Both Delco Radio original equipment and universal service parts are available promptly through United Motors wholesalers.

DELCO RADIO PARTS

A GENERAL MOTORS PRODUCT — **A UNITED MOTORS LINE**

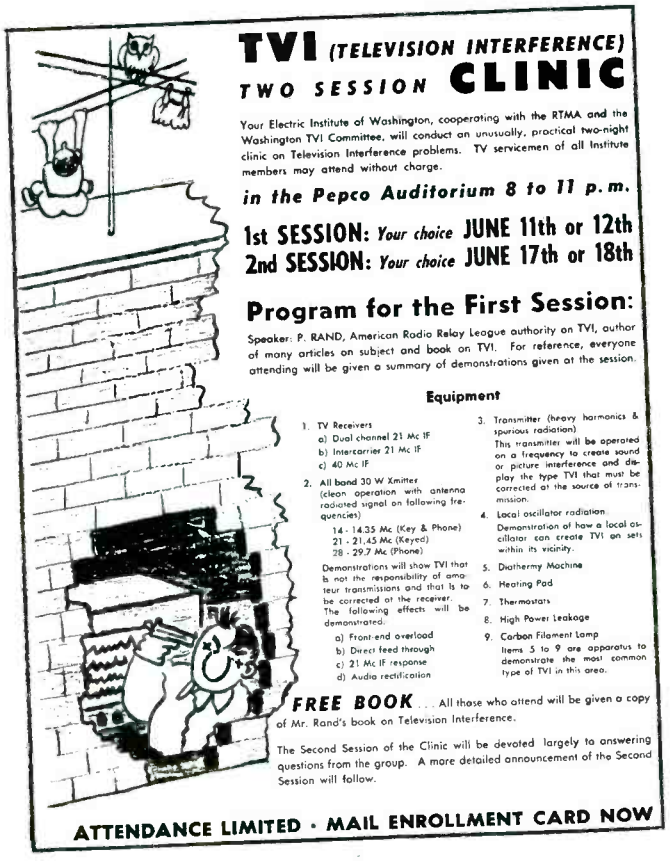
DISTRIBUTED BY WHOLESALERS EVERYWHERE

DELCO RADIO

DIVISION OF GENERAL MOTORS CORPORATION
KOKOMO, INDIANA

THINGS TO REMEMBER ABOUT DELCO RADIO SERVICE PARTS

1. Offer largest market for original-equipment replacement parts.
2. Backed by world's largest factory devoted exclusively to automobile radios.
3. Designed by one of the largest and most forward-looking engineering groups devoted exclusively to automotive radio.



(*Left*)
Bulletin mailed out to TV Service Men in Washington, D. C., area announcing TVI clinic.

A Report on *TVI*

by DONALD PHILLIPS

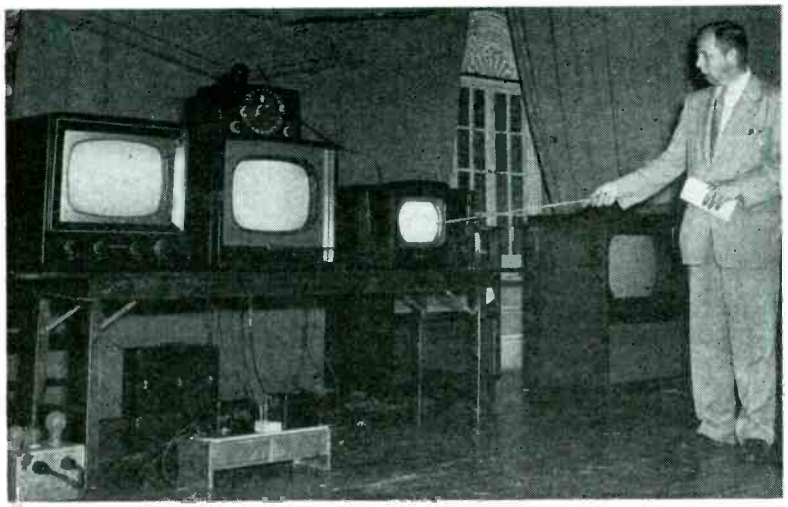
Causes of 29 Types of Television Interference and Cures Found . . . Disclosed at Special Clinic Sessions in Washington, D. C.

PICTURE AND SOUND interference in TV chassis, which has been an exasperating problem for years, has correspondingly concerned many who have sought techniques, components and accessories which might combat the annoyances. Continuing reports on many of the solutions evolved have appeared in this journal. A few weeks ago, in Washington, P. S. Rand* of the Remington Rand Laboratory of Advanced Research appeared before a special TVI clinic and offered one of the most comprehensive reviews on the subject ever prepared, disclosing not only the significant progress which has been made on the TVI-solution front covering diathermy and other appliances, but the steps that can be taken to reduce and eliminate interference that might result from the current use of the 21-mc bands by hams.

Declaring that one of the most important considerations when dealing with either radio or TV interference is that of cooperation between all the parties concerned, the Service Man, TV viewer, manufacturer, and the owner of the device suspected of causing the interference, Rand said that without such cooperation, it is often impossible to arrive at a solution. It is necessary to be familiar with possible sources which might be a small plant, doctor's office, meat market and amateur radio station, or even the chassis.

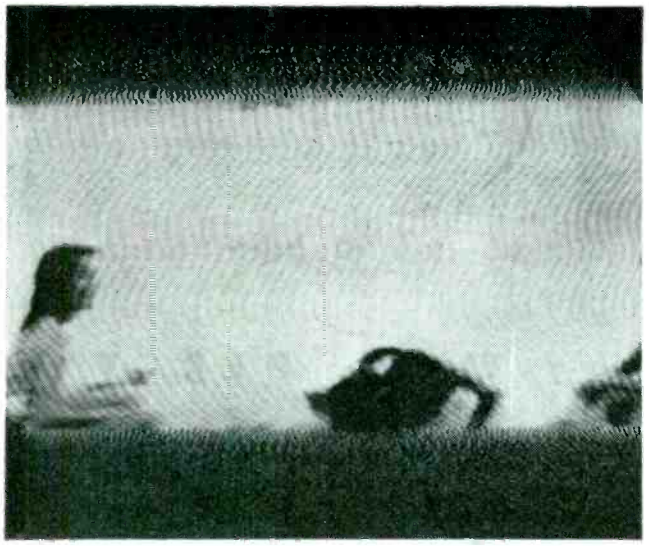
To illustrate, he said, a receiver purchased may be designed to work satis-

*A book by Rand, covering TVI, is available from Remington Rand, Inc., 315 Fourth Avenue, New York 10, N. Y., for 25 cents to cover cost of handling. Requests and coin should be sent to Miss Anne Smith.

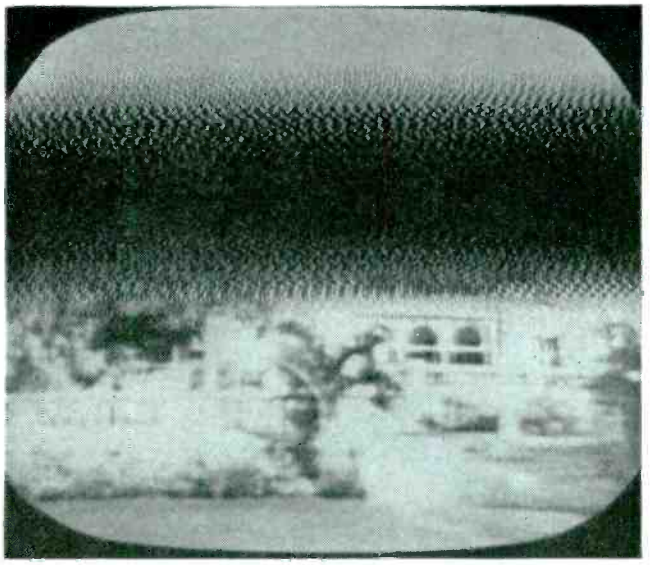


(*Left*)
Rand demonstrating TVI patterns during Washington clinic session.

(*Below*)
Al Coumont, RTMA Service Coordinator, who introduced Rand at the TVI clinic.



TVI caused by diathermy or 120-cycle industrial heaters.



TVI caused by diathermy or 60-cycle industrial heaters.

factorily in a primary coverage area of 5,000 microvolts signal strength, or in a rural area of 500 or more microvolts. Often, receivers are installed in industrial areas where the signal strength may be as low as nine microvolts. In such areas there'll be plenty of snow or tube noise in pictures and undoubtedly pictures will be blanked out at times by various types of man-made interference.

Noting that superhets are inherently subject to interference from a multitude of signal frequencies and TV superhets are no exception to the rule, Rand indicated that because they must operate in the *vhf* region, they are more than usually susceptible to several types. Receiver design was described as being responsible for many forms of interference, such problems occurring because of direct *if* feedthrough or reception; image interference, arising from a combination of local oscillator frequency plus *if;* signal image interference, resulting from local oscillator frequency plus signal frequency; interference occurring at twice oscillator frequency plus or minus the *if;* direct reception of the oscillator signal from a nearby television receiver, and direct reception of one or more of the harmonics of the set's own *if* amp.

The first type of the interference, he said, can be cleared only by suppressing or eliminating it at the source. The second type can be cleared only by modification of the set.

IF and Image Interference

Analyzing the three frequencies that must be contended with in superhets, the TVI specialist listed the frequency to which the receiver is adjusted (and the only frequency in which the user is interested), the image frequency, and the intermediate frequency. The latter two sometimes prove to be headaches in design and service.

For instance, it was pointed out, the image frequency for channel 2 on most receiver's 21 mc *if* is between 102 and 107 mc, and frequencies between 88 and 108 mc are assigned exclusively to FM broadcasting.

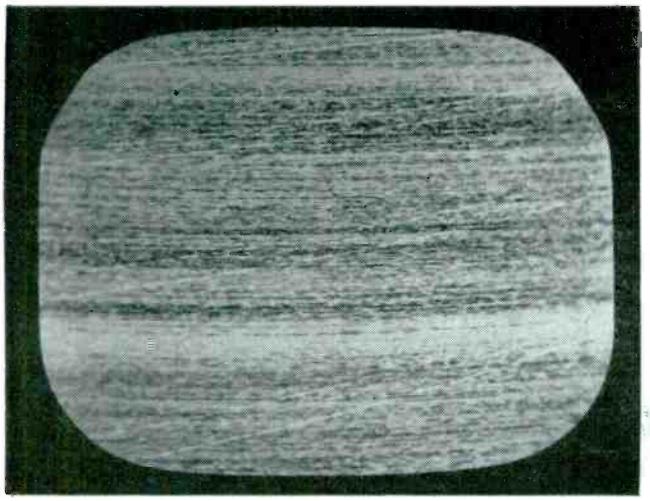
Point-to-point radiotelegraph and amateur services are assigned to frequencies in the lower part of the *if* band. Thus, if the receiver is insufficiently shielded, these signals can cause interference.

Interference due to poor image rejection is usually continuous, he said, and is observed only on certain channels, while interference due to poor *if* rejection can be continuous or intermittent and can be observed on all channels.

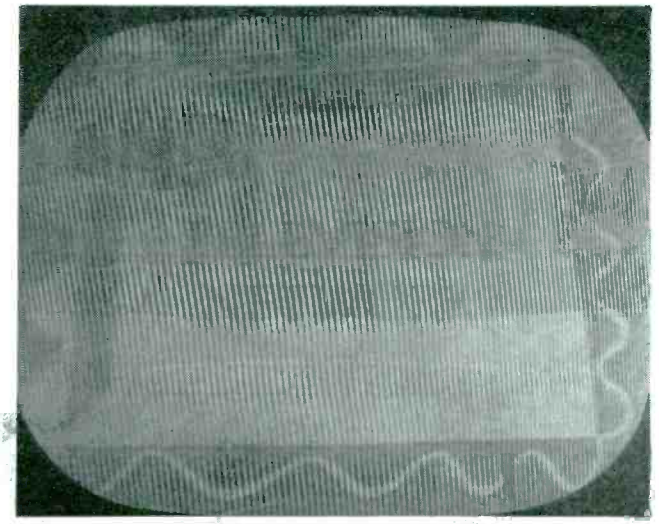
Noting that the home is usually the best place to check interference, Rand

(*Continued on page* 53)

Typical hash obscuring picture from a brush type motor in a household appliance. Requires filtering of motor.



Blanketing pattern resulting from a radio station on another frequency due to poor selectivity in TV receiver front end, easily corrected with a highpass filter on TV set.



Practical UHF TV Antennas and Distribution Systems

(*Left*)
Model of corner reflector antenna design for *uhf*.
(*Courtesy RCA*)

by M. W. PERCY

Design and Operational Characteristics of Broadband Triangular Dipoles, Stacked Vs, Rhombics, Corner Reflectors, Yagis and Distribution Amplifiers

THE ANTENNA, which bounced back to a roaring front, with the rousing acceptance of TV, now appears to be headed for truly exciting days, thanks not only to the new *vhf* areas that will open up soon, but the ultrahigh zones that will dot the country in the not-too-distant future.

As a result experts have been studiously surveying the requirements of the antennas that will have to be used for these new markets, particularly *uhf*. A short while ago, the results of one such study appeared in this journal.* Recently, a report on subsequent tests and results achieved during another probe was completed and reviewed at the IRE national meeting[1] by E. O. Johnson and R. F. Kolar of RCA.

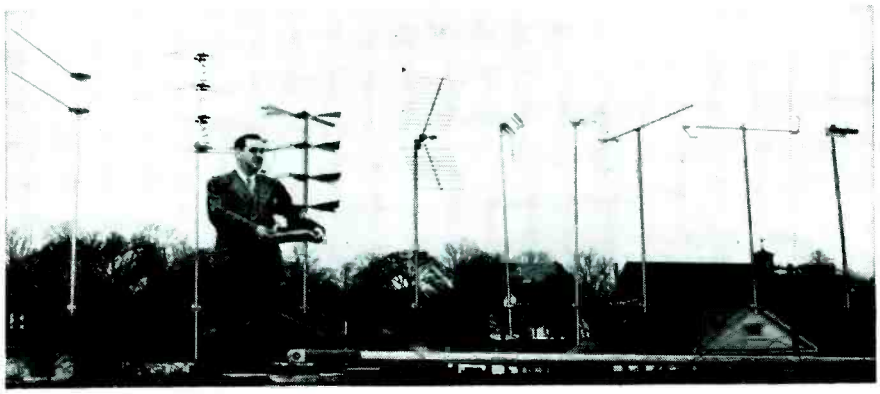
Discussing the general characteristics of low- and high-band antennas, Johnson said that most *vhf* antennas now being used are not entirely satisfactory for the reception of the new *uhf* channels since their gain is low and varies from approximately —10 db to + 3 db relative to a resonant halfwave dipole. Pointing out that they have poor directivity patterns in both the horizontal and vertical directions, he added that the multiple major lobes are usually very narrow, several degrees away from the antenna axis and rotate rapidly with frequency. In low-signal strength areas, it was shown, an antenna rotator would be required to locate one of the major lobes, and multipath ghost images and undesired signals could not be reduced or eliminated with an antenna having such poor directivity characteristics. Emphasizing that the requirements for reception of signals on *uhf* were somewhat different from those on *vhf*, Johnson said that the signal intensities fall off with distance from the transmitter at a more rapid rate and reflection problems are likely to be greater. Intervening objects such as trees, buildings, and the earth become better absorbers and reflectors of the higher frequency waves, he continued, and generally the receiving antennas must have greater gain and directivity to overcome these new problems. It has been found that in areas of high signal intensity that are free of multiple ghost signals and interference, the simple *uhf* broadband triangular dipole can give good service, affording medium gain and directivity at low cost. In areas of medium signal intensity that are free of multipath signals and interference, the dual *V* or rhombic types were described as effective in view of their increased gain and low cost. And in areas where multipath ghost signals

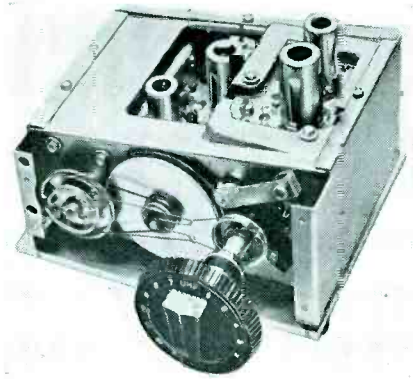
(*Continued on page 47*)

*Hall, Russell, J., *The Stratford, Conn., UHF TV Tests*, SERVICE: March, 1952.

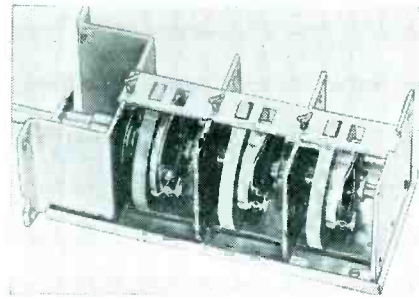
[1]Sponsored by the IRE Professional Group on Broadcast and TV Receivers.

Jerome E. Respess, president of LaPointe Plascomold with recently developed experimental line of VEE-D-X *uhf* antennas. From left to right: double vee; colinear array; stacked bowtie; corner reflector; cubicle quad; folded dipole; yagi; rhombic and slot.

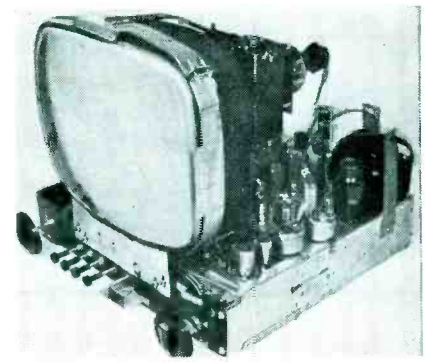




Closeup of tuner section showing dial mechanism.



Mallory continuous tuner used in the Arvin *uhf/vhf* input system.



View of Arvin chassis showing position of all-channel tuner.

[*See Front Cover*]

ALL-CHANNEL (2-83 Mc) TV Receiver

by RALPH G. PETERS

THE FREEZE-LIFT and subsequent announcement of a new allocation schedule* which provides for eventual construction of over a thousand *ultra-high* stations has inaugurated a new cycle of activity revolving about *uhf/-vhf* gear development and production. During the past few months there have appeared several discussions on this trend, covering progress already achieved in tuner, converter and input system design for high-low band coverage.

Cover Circuit

This month the input circuit of a *uhf/vhf* receiver is offered; Arvin all-channel chassis. A variable inductance system[1] is used for tuning of the *uhf* band. The double conversion technique is employed with a 6BQ7 serving as an *if* amplifier tuned to 127 mc. The *uhf* unit is actually made up of an *rf* oscillator (6AF4) and the *if* amplifier. This unit operates in tandem with a conventional *vhf* tuner unit. When the *vhf* channel selector is switched to the *uhf* position, the input of the *vhf* section is tied electrically to the *if* output of the *uhf* section. The *vhf-rf* amplifier then acts as an *if* amplifier at 127 mc and the *vhf* oscillator accomplishes the second conversion to the receiver *if*, which is 41.25 to 45.74 mc. The tuner units are always mechanically connected, providing continuous tuning for *uhf* and switch-type tuning for *vhf*.

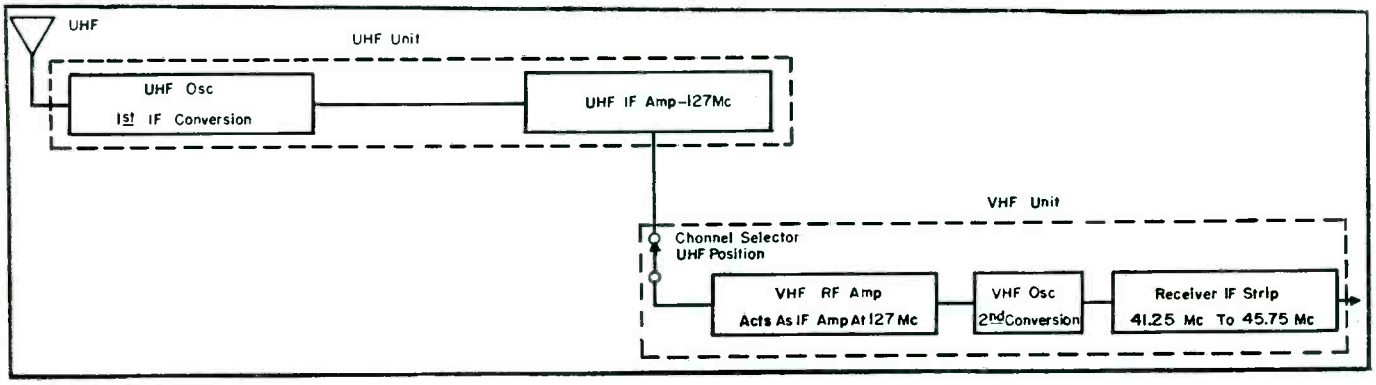
VHF Oscillator Adjustment

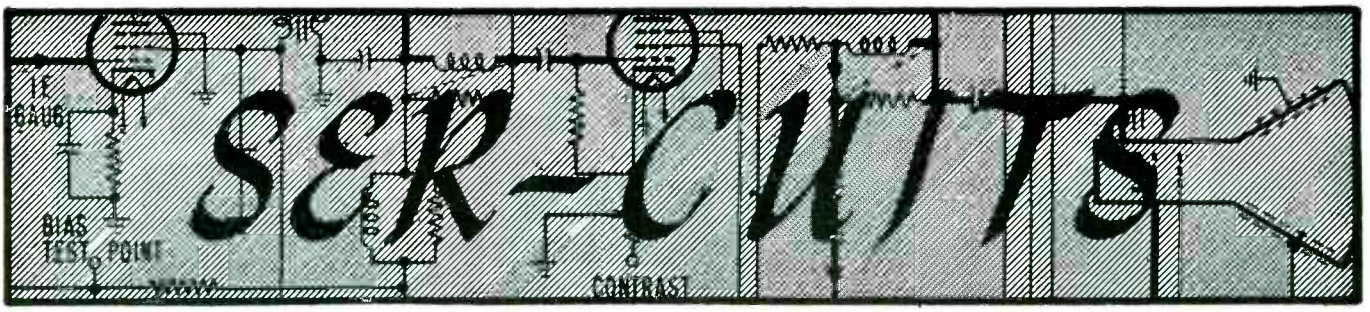
But one set of tuning knobs are employed. The two tuner units are electrically interconnected only when the channel selector is switched to the *uhf* position. In the event that *double-c nversion-tweets* occur, the *vhf* oscillator can be readjusted by removing the control knobs, which makes accessible a *vhf* oscillator adjustment screw. Only a slight shift is necessary to eliminate a tweet. Two antenna inputs are provided on the receiver; one for *uhf* and one for *vhf*.

*SERVICE; May, 1952.

[1]Based on Mallory *Inductuner* principle.

Block diagram illustrating operation of *uhf* and *vhf* inputs in the Arvin chassis.





by **DANIEL NEWMAN**

Allen B. DuMont Laboratories, Inc.

Analysis of DuMont Dynamic Demonstrator TV Circuitry

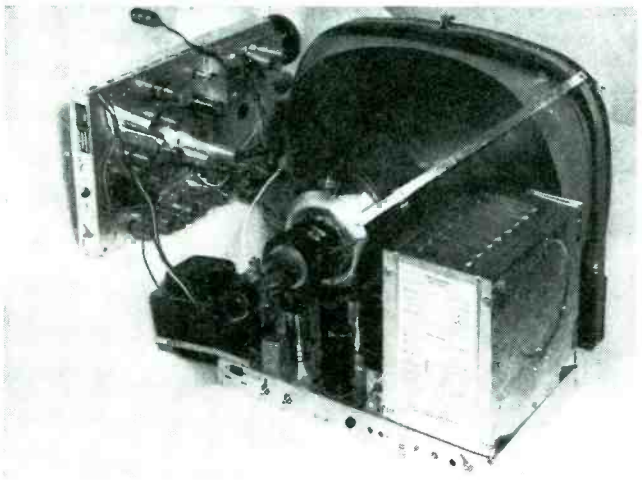


Fig. 1. Dual chassis of the DuMont RA-160 which provides a maximum of chassis *floor-space* for the placement of components in demonstrator.

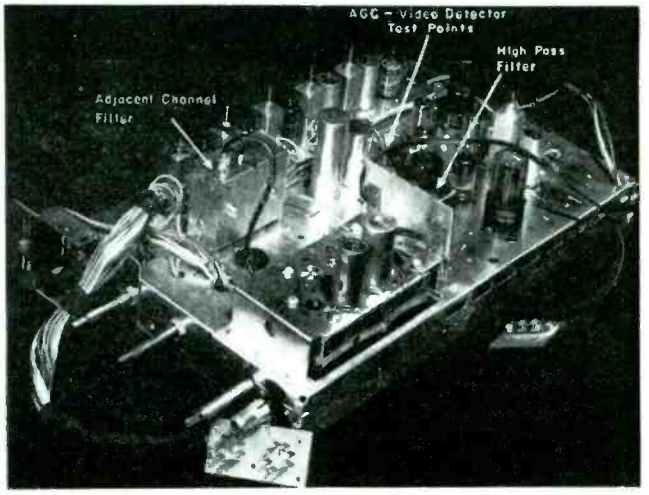


Fig. 2. The signal chassis, with its high-pass filter which is placed in series with the antenna input to the tuner to attenuate frequencies below 50 mc.

IN EFFORTS to simplify the processes of troubleshooting and extend familiarization with the variety of special types of components employed in TV chassis, many techniques have been employed. One of these approaches, the *dynamic demonstrator,* has been found to be extremely effective in teaching TV Service Men the ins and outs of typical receiver circuits. As noted in an earlier discussion,[1] in the demonstrator, many parts can be inserted into pin jacks rather than joined in the usual soldering method. A wide variety of troubles which can affect circuits can be simulated by quickly substituting wrong or defective parts. The results of these troubles show up on the TV screen, and on a 'scope and voltmeter. Recently, there was developed a portable type demonstrator, which can be transported to clinics for demonstrations.

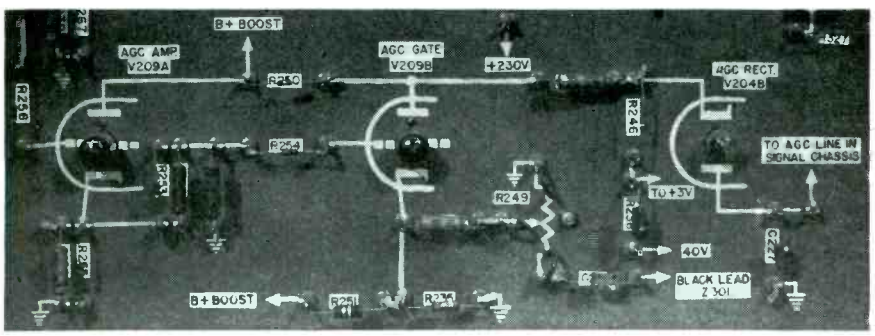
The demonstrator, featuring use of a DuMont RA-160 dual chassis, is used in conjunction with a 21KP4,[2] set up alongside the demonstrator unit, together with a 'scope[3] which is used to show the waveforms existing at various points in the chassis. The entire unit constitutes a giant-size, operating television receiver and can be easily viewed by groups of 200 people or more.

The demonstrator graphically discloses the effects of component failures on both the sound and picture.

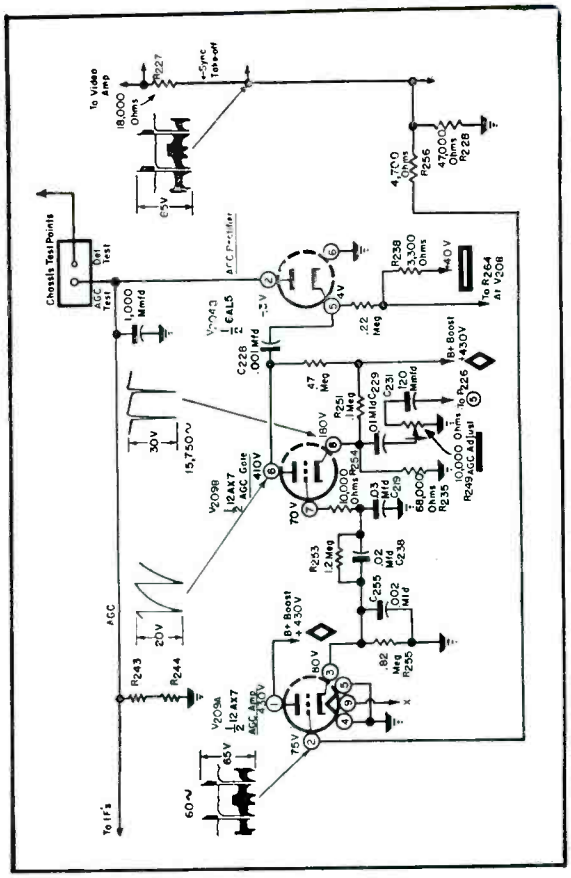
The dual chassis construction was found to lend itself admirably to this plan, since the *rf-if* circuits are incorporated in a separate *signal chassis.* All of the circuitry in the model's sweep chassis (horizontal and vertical oscillators and sweeps, as well as the low and high voltage power supplies) is expanded on the front panel of the demonstrator. In addition, the vertical and horizontal sync clipper chains and *agc* circuits which are normally mounted on the signal chassis, were disabled in the signal chassis and re-

[1]Martin, Wyn, *TV Dynamic Demonstrator,* SERVICE; April, 1952.

Fig. 3. A view of demonstrator chassis, illustrating the *agc* setup with separate tubes.



[2]DuMont self-focus picture tube.
[3]DuMont 304-H.



produced on a 3′ x 4′ demonstrator panel.

All wiring has been concealed behind the front panel of the demonstrator, with all terminal points brought out to pin-jacks. All resistors, capacitors, transformer leads, etc., are fitted with phone tips and can be plugged into appropriate pin-jacks on the panel.

Signal Chassis Circuit Analysis

A special, high-pass filter is placed in series with the antenna input to the

(*Continued on page* 53)

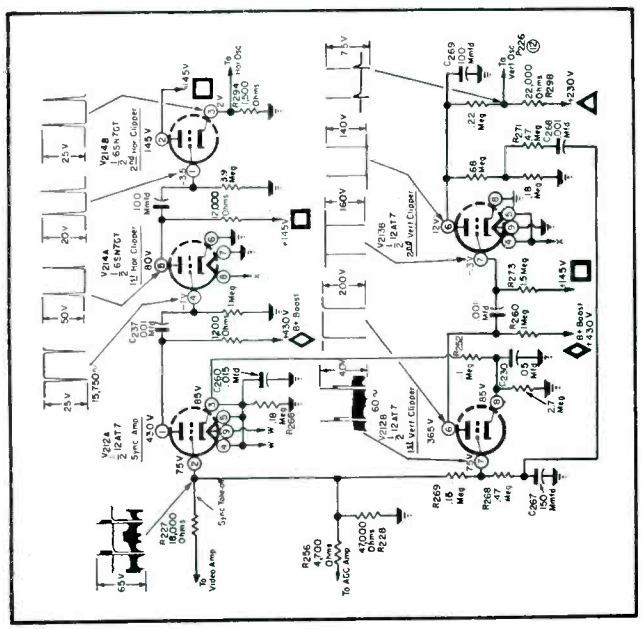


Fig. 4 (*above*). Horizontal and vertical sync circuits in DuMont chassis.

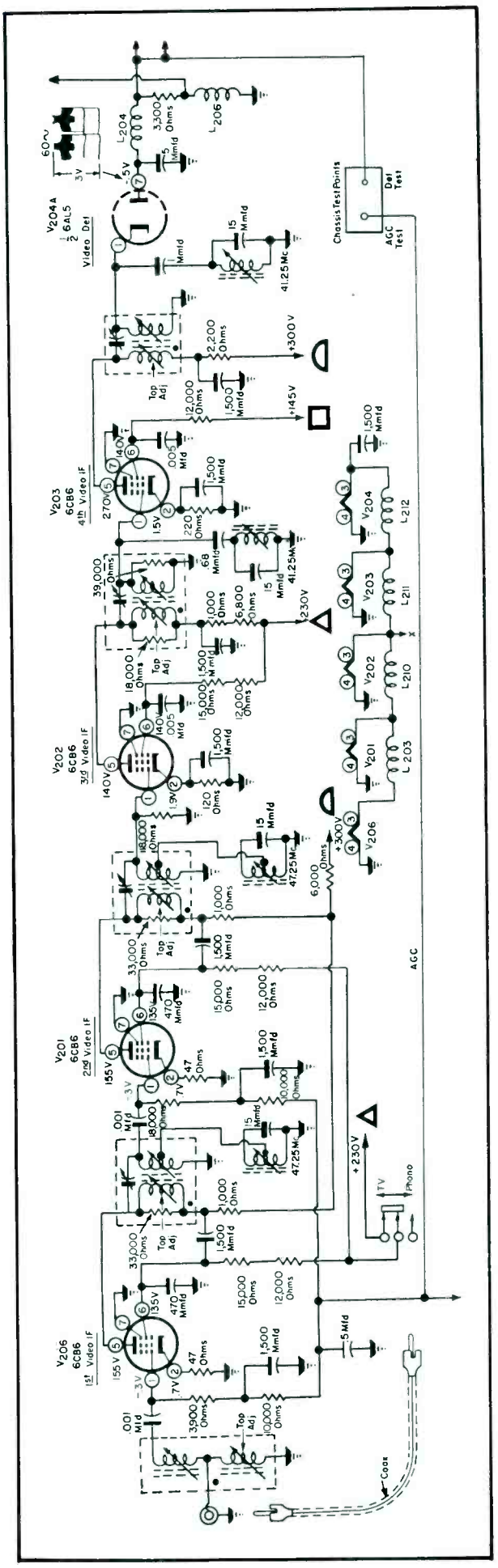
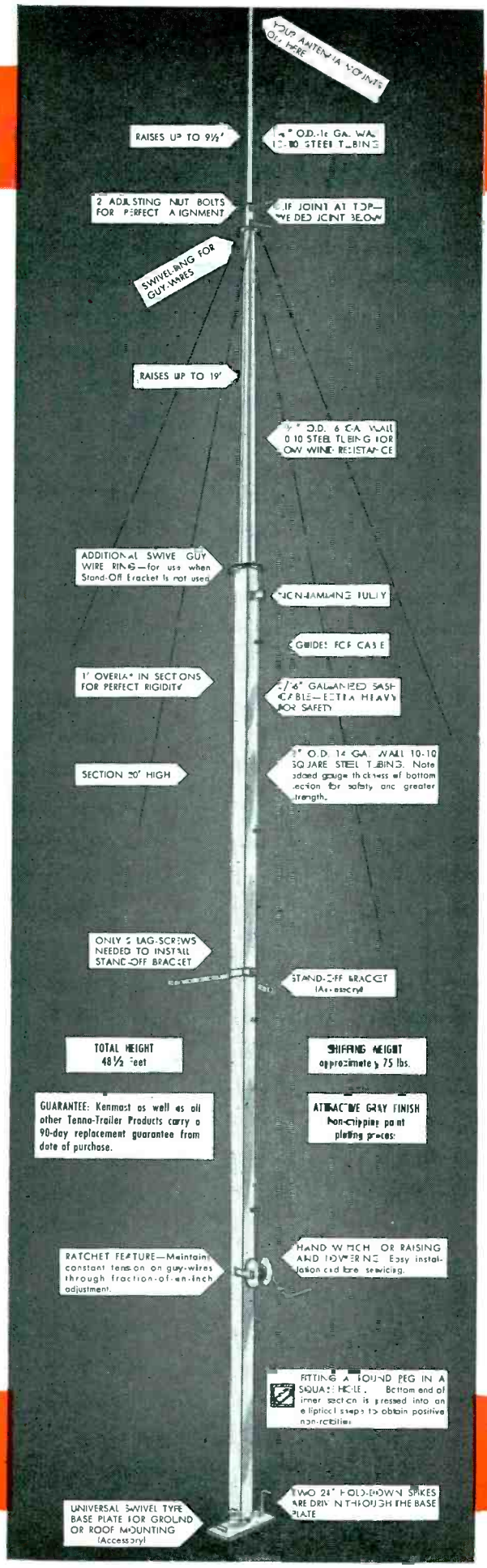


Fig. 5 (*below*). Circuit of the video *if* amplifier which employs an *if* of 45.75 mc.

Fig. 6 (*above*). Circuit of the *agc* system which consists of an *agc* amp, *agc* gate and *agc* rectifier.



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The growing demand for an easily transported, easily installed, low cost, telescoping mast, brought about the development of the new Kenmast. Its many outstanding mechanical features have been perfected and thoroughly tested and it is now ready for the market.

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lead the field . . . over 3,000 in daily use on home demonstrations all over the nation.

TV Installation

(*Continued from page* 18)

since it contains a normal television receiver input circuit, including tubes, a long extension cord can be used to power the unit as it is carried through the test procedures. With planning, however, the *field strength meter* makes it possible for one man to position and orient an antenna alone, and to be sure of results while he is in a position to do something about it.

The basic meter scale indicates a nominal 50 microvolts of signal strength from the antenna, when the pointer reads full scale with the switch in the *X1* position. In operation, the actual antenna and leadin which will be installed, are connected to the input terminals of the instrument, the power turned on and the channel selector and fine tuning dial turned to a transmitted signal which is on the air. Then, one can tune for a maximum meter deflection for any position of the antenna which seems logical. The *field strength meter* should then be left alone and the antenna moved and turned to all its possible locations to compare, with meter readings, the results at the various locations. If the meter tends to read off scale, it will be necessary to turn the attenuator switch to the *X10, X100,* or *X1000* position to interpret the increased signal strength. In general, although the maximum signal strength should always be obtained; an indication of about *10* (minimum) scale divisions with the attenuator switch in the *X10* position will insure a satisfactory picture in the receiver after the installation has been completed. Experience will show what the exact minum indication should be for the type of receiver being installed.

In remote areas, far removed from transmitters, or in mountainous areas, the field strength meter is an invaluable aid, serving to anticipate the proper locations for antennas experimentally. If you are working in such an area, it is necessary to consider the height above ground as an important factor in antenna location. It has been determined experimentally that height alone is not an all-important factor, without considering the cyclic effect which goes along with variable height. For instance, in erecting antennas in Kankakee, Ill., to receive signals from Chicago, some 60 miles away, it was found that optimum antenna heights occurred at points separated by about 16 feet, and that each successive strong point was better than the lower one, but that the

(*Continued on page* 28)

TV Installation

(*Continued from page 27*)

intervening heights were of relatively very little value.

When operating at positions where power line voltage is not available, it will be necessary to furnish a portable power supply. One supply which has been used successfully is a motor generator unit[2] which uses an input of 6 volts at about 13 amperes, and is in the range for storage-battery operation. The output wil replace a commercial power source to power the instrument.

Where local rulings permit, the mast may be mounted on a chimney or on a vent pipe. Otherwise a side wall mounting bracket or a roof-top mount will be necessary. To assure completion of the job in a single trip, a variety of mounting kits should be carried in the truck so that any type of mounting can be achieved as required. It is important to be sure to support any outside antenna with at least three strong guy wires and ground the mast with heavy wire and good ground clamps. The antenna leadin will usually be a flat 300-ohm ribbon type, and should be supported with stand off insulators made to fit. If the leadin passes around the edge of a roof, a piece of insulating tubing should be slipped over the leadin at the point where it fits around the edge, to prevent any abrasion or contact between the leadin and the edge. The leadin should be twisted so that it has one spiral turn about each 18" to two feet on the outside of the building; this reduces the tendency for the leadin to pick up ignition noise and similar spurious forms of interference. There is a very important point, which, if followed closely, will increase the value of your services immeasurably; a good grade pitch or caulking compound should be used, every place where a hole has been made in the roof being sealed completely. This includes the attachment for the mast mounting plate, the anchors for the guy wires, the standoff insulators, and any other places where the roof has been pierced or damaged. A lightning arrester should be connected to the leadin just before it passes through the wall of the building, and the opening which has been made to pass the leadin through the wall, caulked. The entire leadin run should be made as short as possible without coming close to power lines, water pipes or other large metal objects, or any moving objects which would rub the leadin and abrade it. Once inside the building, the lead can be passed directly as possible to the position where the set is to be used.

A new item, not widely used but available from distributors, is a wall outlet for the antenna. If this can be worked in, it offers a good, clean, permanent termination for the leadin. Then the customer can plug or unplug the antenna to move the set for cleaning without the danger of straining the connections.

Other Antenna-Installation Possibilities

There are many new homes, apartment buildings and housing projects now under construction, and it appears that the building boom will last for some time. Nearly all new homes in television reception areas will have a set and will be in need of an antenna installation. It would be wise to contact local architects and builders and arrange to place an inside-the-wall installation of leadin and wall outlets for antenna connections right in the new home, *as it is being built*. This should be a standard part of a new home plan, and one can cash in by performing an easier installation during the rough stage of construction before the walls are covered. TV antenna installation should become a standard sub-contract service in buildings, right along with carpentry,

[2]Carter A1040C.

plumbing, electrical, and the other building trades.

If you live or work in a metropolitan area where there are many apartment buildings, you should not pass up the opportunity to sell master antenna and distribution installations to apartment house owners. Tenants are now more anxious than ever to have television sets, and need an antenna feed. Landlords can protect the appearance of their building as well as keep it up to date by having a master installation to serve all the apartments. In some cases, tenants will share the installation costs.

Many modern factories are being built with recreation facilities for the workers, and they include television in their standard furnishings. Each one requires an installation. Again, the job can be performed more efficiently when the building is in the rough stage than when it has been completed.

After the antenna and leadin have been installed, customers should be told exactly what has been done, pointing out the safety factors. It is a good policy to obtain, in writing if possible, a statement from the set owner that he is satisfied with your work and believes that it will not cause any future difficulties, such as a leaky roof, which might be held against you, because of your installation.

[To Be Continued]

* * *

JENSEN HI-FI BROCHURE

A 20-page hi-fi catalog, *1020,* covering the selection of loudspeakers and enclosures, and describing how to listen to loudspeaker demonstrations, has been published by Jensen Manufacturing Co., Division of The Muter Co., 6601 S. Laramie, Chicago, Ill.

Catalog contains data on 2-way system components and cabinets, tri-plex 3-way complete reproducer in a back-loading folded horn cabinet suitable for corner or sidewall use; separate 15″ and 12″ cabinets employing latter design; 3-way system components and a 12″ compression driver coaxial.

Tube News

by L. M. ALLEN

IN THE DESIGN* of a centering magnet, particular attention must be given not only to uniformity of the magnetic field but also to straightness of the field lines. Nonuniform fields and curved lines produce serious defocusing, especially with electrostatic-focus tubes designed to operate at low focusing voltages. As reported last month, field uniformity can be measured with a gauss meter and a jig which employs a bakelite rod with five holes, and permits insertion of the gauss-meter probe. The probe is first inserted in the center hole, and the magnet to be tested is slipped over the rod and moved up and down until the point of maximum field strength is located to line up with the tip of the probe. With this arrangement, the field strength can be measured at the center of the magnet, and at distances of ¼" and ½" from the center on either side.

Curvature of the field lines can be determined through the use of the iron-filings procedure. Straightness of field lines is critical only in the region through which the electron beam travels and in the plane perpendicular to the tube axis and parallel to the reference line. Field lines in this region must be straight through the entire range of the magnet from zero to full strength. A further check of line straightness can be made by placing the magnet on a picture tube in operation and observing either a resolution test pattern or a blank raster. With a well-focused test pattern or raster, the magnet should be rotated through 360° and varied from zero to full strength and the pattern or raster checked for any change in focus. When the centering magnet is well-designed, the change in focus, if observable at all, will be slight.

The centering magnet should be placed as close to the base end of the deflecting yoke as possible so that the field of the magnet will not extend into the field of the electron-lens portion of the gun and, therefore, cause focus distortion. Since the region between the base end of the deflecting yoke and the electron lens is limited, the pole pieces of the centering device must be comparatively narrow to restrict the magnetic field to this region.

Ion-Trap Magnets

The effect on spot shape of the magnetic field of the ion-trap magnet is less than that of the centering magnet because the beam diameter is much smaller in the ion-trap region. Nevertheless, the effect of an improperly designed ion-trap magnet can be detected and is quite noticeable with a picture tube having low-voltage electrostatic focus.

Best performance is obtained, therefore, when the field of the ion-trap magnet is uniform and the field lines are straight throughout the region traversed by the beam. If a magnet having a nonuniform field is used, the side of the tilted gun chosen for location of the magnet influences the effective value of the field.

According to present design, an ion-trap magnet for use with a tube having electrostatic focus generally has a field

*Based on copyrighted notes prepared by the RCA tube department.

strength about 5 or 10 gausses less than that of a magnet used with a comparable tube having magnetic focus. The field strength requirement for the electrostatic-focus tube is lower because there is no external focusing device to shunt the field of the ion-trap magnet when it is moved along the neck of the picture tube toward the faceplate. A field strength appreciably higher than that specified will be found to distort the focused spot, change the focusing voltage of the tube, and also require a shift in the position of the magnet on the neck of the tube. A field strength appreciably lower than that specified will be found to decrease maximum brightness, make centering of the beam difficult, and may cause neck shadow.

*Spook Interference**

Visible interference in the picture or instability of the sync circuits may be caused by a type of *hf* radiation from the damper tube and its leads, which is picked up in the receiver *rf* and *if* circuits. The interference, which appears in the picture as a narrow vertical line very near the left margin of the raster, looks similar to Barkhausen oscillation. When this interference was first observed as an effect distinct from Barkhausen oscillation, its nature seemed quite mysterious and, as a result, it became known as the *spook* in the industry. If the signal is weak, the line is black and has ragged edges; if the signal is stronger, the line has visible crawling *beats* within its margins. The line usually is not seen because it is in the blanked portion of the raster or off the picture-tube screen.

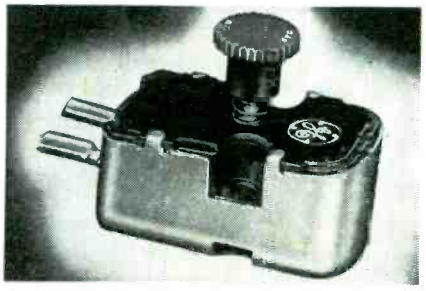
Appearance of this *spook* interference is coincident with the start of conduction in the damper tube. Shortly after the completion of retrace, the damper-tube current rises from zero to its peak value of approximately 400 milliamperes within a period of the order of .1 microsecond. These high-frequency harmonics are easily radiated and picked up by the sensitive *rf* and *if* circuits of the receiver. As a result, the *spook* interference at low *rf* is more pronounced; it diminishes steadily at higher frequencies.

To minimize *spook* interference, the antenna and the *rf* and *if* circuits should be placed as far as possible from the deflection circuits. It is also desirable to minimize the radiation as much as possible. In the autotransformer type of deflection circuits, most of the radiation usually comes from the *B*+ wiring connected to the damper-tube plate. An *rf* choke of the order of 2 microhenries placed in series with the damper-tube plate at the tube socket has been found to be quite effective in keeping the *rf* off the *B*+ leads; in addition, the use of a mica bypass capacitor of approximately 100

(*Continued on page* 55)

John T. Thompson (left), G.E. sales manager for replacement tubes, and *G. A. Bradford*, G.E. tube department ad manager, discussing promotional aids offered to Service Men in connection with the company's nationwide contest based on service promotion campaigns conducted by these shop owners between June 15 and August 15. Three top winners in the contest will receive 1952 Dodge panel trucks. One hundred other winners will also receive prizes. Entries will be judged by impartial judges on basis of planning, originality and results reported by dealers following the two-month campaign period. Contest is being conducted through all G.E. tube distributors.

Interior views of E-V mobile demonstration high-fidelity audio show on wheels with an 1,850 cubic foot interior (12,000 pound CaraVan with a 38 foot trailer). In *Audio CaraVan* have been installed Electro-Voice Klipsch-licensed folded horn corner cabinets and cornerless corner cabinets and speakers and speaker systems fed by broadcast quality recording equipment such as Ampex and Magnecord tape recordings and playback units; Rek-O-Kut turntable with E-V phonocartridges; and a console switching control system that permits listening comparison tests. On view and for test also are E-V microphones, plus Electro-Voice automatic self-tuning Tune-O-Matic and Tenna-Top TV boosters and Tele-Vider TV distribution systems. Demonstration unit is now being readied for the road.



Gold-plated variable-reluctance cartridge equipped with a dual sapphire and diamond *baton* stylus. Cartridge is said to be designed to perform with uniform velocity response up to 15,000 kc. Changing from standard or microgroove stylus possible by twisting positioning knob. Six to eight grams of pressure for all types of records.

(*Courtesy G.E.*)

At Permoflux booth during Chicago Parts Show.

AUDIO installation and service

Phono-Tape-Wire-PA-Amplifiers-Speakers

by KENNETH STEWART

Design and Application Features of Sound Survey Meters...Preamps...Hi-Fi Cartridges...Speakers...Three-Speed Turntables.

THERE ARE MANY AUDIO installation and service projects which demand a careful preview of conditions to satisfy completely all requirements; mechanical, electrical, electronic and acoustic. Several practical instruments have been developed to provide such a check survey. One of the most interesting in this category has been the sound-level meter, evolved in the '30s.

Applications

It has been found useful in the lab, shop and field; for measuring the sine-wave response characteristics of speakers and rooms, and for checking levels of reproduced sound in theatre and *pa* systems. Many have also found the units ideal for preliminary field studies of acoustical systems and materials and the determination of noise levels in homes, offices, factories, and other buildings. While the instruments' virtues have been acknowledged as excellent, its use for quite awhile was not too widespread because of size and the rather involved application steps which had to be followed.

To overcome these objections, the possibilities of more compact and simplified designs were studied. Reporting on the results of one such effort at the recent IRE national convention,* Arnold Peterson[1] described a unit which employs a microphone, calibrated attenuator, amplifier indicating meter and weighting networks. The microphone was noted as being connected directly to a high-resistance tapered potentiometer, calibrated as an attenuator, the signal from the pot being amplified by a subminiature connected as a triode. The output of this stage was said to be modified by one of three weighting networks and then amplified by a three-stage subminiature-tube amplifier. Peterson pointed out that the last of these stages drove a rectifier-type meter, a voltage proportional to the current in the meter circuit then being returned to the grid of the second stage as negative feedback.

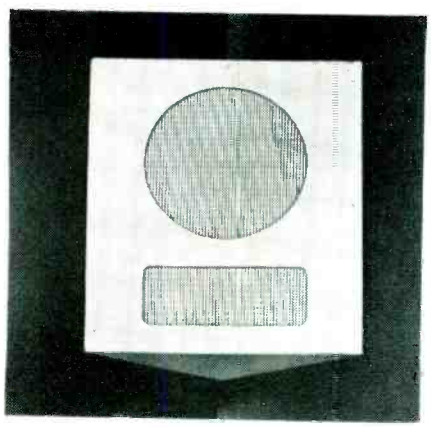
Analyzing the components used, the audio specialist declared that the calibrated potentiometer was a continuous level control, an innovation in commercial noise meters. It was unique, it was said, because it permits one, when measuring noise, to adjust the level control so that the fluctuating reading of the meter balances about the 0-db mark on the meter. Then the level, which can be given directly by setting of the attenuating pot, was described as covering the most often used range, or from 50-100 db. An additional 30-db attenuation is also provided; this with the meter's — 10 to + 6 db range provides a total sound-pressure-level range of from 40 to 136 db. The 40-db lower limit was noted as being approximately the back-

(*Continued on page* 52)

[1]General Radio.
*Presented as an IRE Professional Group on Audio paper, and published in the IRE-PGA May Transactions.

An 8", wide range, wide-dispersion speaker, which features dual concentric horn loading of the apex to extend the *hf* response to over 13,000 cps. Has a 25-watt power rating, an oversized voice coil, wound on a dural suspension which dissipates heat through a filtered pressure-operated air chamber located within the magnet structure. (*Diffusicone 8; University Loudspeakers, Inc. 80 South Kensico Ave., White Plains, N. Y.*)

Bass-reflex speaker baffle for corner mounting. Available for 8" and 12" speakers in mahogany or blonde leatherette. Has ⅜" wood sides and back plus ½" cellufoam acoustic lining. (*Argos Products Co., 4753 N. Broadway, Chicago 40,*



Three-speed portable phono. Plays records of all three speeds and all three sizes. (*V-M Corp., Benton Harbor, Mich.*)

Servicing Helps

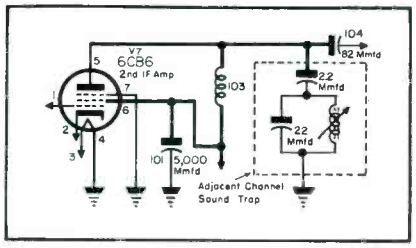
by M. A. MARWELL

To MINIMIZE INTERFERENCE caused by the sound carrier of the lower-frequency adjacent channel, sound traps have been found effective. Recently such a device comprised of a slug tuned coil and two fixed capacitors, was designed for Stewart-Warner 19-tube chassis, using 6CB6 *if* tubes.

When required, the trap should be added to the plate circuit of the 6CB6 second *if* amplifier. The trap coil should be mounted in the hole directly in front of the 6CB6 third *if* amplifier. The coil should be inserted from the under side of the chassis and pushed through the hole until the mounting clip snaps into position. Then, the open end of the 2.2-mmfd capacitor should be connected to pin 5 of the 6CB6 second *if* amplifier, and the junction of the 22-mmfd capacitor and the coil connected to chassis ground.

After installing the sound trap, the following adjustments will be necessary: the slug should be rotated counter clockwise until the stem of the slug is out as far as possible. The receiver should be tuned for a normal picture by using the fine tuning control. A pigtail should be soldered to the tube shield of the mixer-oscillator (V_5), and then the shield lifted so that it is not grounded to the chassis (but not removed from the tube). A signal generator, set to 27.4 mc. should then be connected to the pigtail and a *vtvm* to the green lead coming from the crystal detector shield can. The adjacent-channel sound-trap slug should then be set for minimum reading on the *vtvm*. With a normal picture and a properly tuned receiver, a slight readjustment of the slug may be necessary in weak signal areas to minimize further sound interference.

Fig. 1. Circuit of Stewart Warner second *if* amplifier modified with adjacent sound trap.



Motorola Service Notes

Reducing Beat Interference . . . TS-325, TS-326 and TS-351: Beat interference, appearing as either a stippled effect or diagonal lines, can be lessened by moving the high side of R_{225}, the detector-load resistor, to the junction of L_{210} and L_{211}.

TV Tube Brighteners*

To increase picture brilliance (via increased electron emission) on older picture tubes, two methods are em-

(*Continued on page* 54)

for greater speed and accuracy of **TELEVISION INSTALLATIONS** *in any locality use the new*

Simpson

MODEL 488

TV FIELD STRENGTH METER

In addition to location of maximum signal areas, the Simpson Model 488 Television Field Strength Meter is also ideal for antennae orientation, comparison of antennae systems, adjustment of TV signal boosters and checking antennae and lead-in installations to list but a few of the many functions available . . . THE 50 MICROVOLT FULL SCALE RANGE IS AN OUTSTANDING FEATURE FOR THOSE CONCERNED WITH FRINGE AREA INSTALLATIONS WHERE MAXIMUM EFFICIENCY MUST BE ATTAINED . . . The 500, 5,000 and 50,000 microvolt ranges extend the usefulness of the Simpson Model 488 into areas of higher signal strength. The large 4½-inch modernistic meter is easily read from a considerable distance and all controls and connections are arranged for greatest accessibility. Model 488 is housed in a beautiful gray hammerloid finished case for greater portability.
LINE VOLTAGE: 105-125 volts, 50-60 cycles.
SIZE: 8" x 11" x 8½".
WEIGHT: 11½ lbs. Shipping weight 15 lbs.
DEALER'S NET PRICE, including operating instructions and shoulder strap $89.50

SIMPSON ELECTRIC COMPANY
5200 WEST KINZIE STREET, CHICAGO 44, ILLINOIS
Phone: COlumbus 1-1221
In Canada: Bach-Simpson, Ltd., London, Ontario

CONSERVE CRITICAL MATERIALS

Rep Talk

NORMAN B. NEELEY, (Los Angeles), has been elected national president of the *Reps*. Other national officers elected were: *Russ Diethert* (Chicagoland), first vice president; *Wally B. Swank* (Empire State), second vice president; *Dean A. Lewis* (California), third vice president; *James P. Kay* (Missouri Valley), secretary; and *Royal J. Higgins* (Chicagoland), treasurer. . . . Three new members have been elected to the board of governors: *L. W. Beier* (Chicagoland), subsequently elected chairman; *B. C. Landis* (New York); and *Wilmer S. Trinkle* (Mid-Lantic). Bier was formerly national treasurer in '51, and Trinkle, national president. . . . *M. K. Smith*, Atlanta, Ga., was reelected to the board of governors. *R. W. Farris*, Kansas City, board chairman the past two years; *D. N. Marshank*, Los Angeles; and *W. E. McFadden*, Columbus, Ohio, are the remaining members of the board. . . . New national committees for '52 have been announced: Industry relations—*Walter Hannigan*, Boston, chairman; *John Kopple*, New York; *David H. Ross*, San Francisco; *John Thompson*, Atlanta; *Wm. S. Lee*, Detroit; *Neal Bear*, West Richfield, Ohio; and *Bruce MacPherson*, Ft. Wayne, Ind. Nominating committee—*S. K. Macdonald*, Philadelphia; *C. B. Parsons*, Seattle; *W. Cliff McLoud*, Denver; *F. Edwin Schmitt*, New York; *J. Earl Smith*, Dallas; and *John Cota*, Atlanta. Membership committee — *Paul Sturgeon*, Boston; *James Pickett*, New York; *Percival Ridley*, Chicago; *H. A. Kittleson*, Los Angeles; *C. L. Pugh*, Columbus, Ohio; and *John Crockett*, Dallas. . . . The *Reps* have announced publication of their '52 *National Membership Roster*. Copies are available by request, on business letterhead, from national office at 600 S. Michigan Ave., Room 1425, Chicago 5, Ill. . . . *Arthur J. Schubert* has joined the staff of *Henry D. Sarkis*, 6560 Sheridan Rd., Chicago. . . . *Atcheson and Adams*, P.O. Box 2158, Greensboro, N. C. (Southeastern states); *Hastings Sales Co., Ltd.*, 11419 Vanowen St., North Hollywood, Calif. (southern California); and *Robert Milsk Co.*, 19367 James Couzens Highway, Detroit 35, Mich. (Michigan), have been named reps for Planet Manufacturing Corp. . . . *Mike Roth Sales Co.*, Cleveland, Ohio; *Merrill Franklin Co.*, Minneapolis, Minn.; and *Theodore Lowell*, St. Louis, Mo., have been appointed reps for the Pyramid Electric Co. . . . *James H. Podolny*, 4176 Coleridge St., Pittsburgh, Pa., has been appointed rep for the TV and radio department of the electronics division of National Electric Products Corp., in western Pennsylvania, West Virginia and Ohio.

Norman Neeley

Business Aids . . .

[If you have a business-aid problem, send it to ye editor, and every effort will be made to publish a solution in an early edition of SERVICE.*]*

What types of insurance are needed and necessary to cover daily service business practices?—*S. E. F.*

Dear S. E. F.:

Insurance is an important part of the expense of operating a business and is definitely needed to protect an investment, with the amount and type of insurance depending on individual needs.

Basic coverages usually required for any moderate-sized operation which includes premises such as a store or factory, are: Fire coverages for stock and fixtures, and any machinery or tools, including vandalism and malicious mischief; fire coverage on customers' goods; public liability, or comprehensive general liability. *Public liability* would cover injury to anyone other than an employee inside or outside of the property where you conduct your business, due to negligence of maintenance of that property, depending on your legal liability as stated in the lease as to maintenance of that property. Limits are written according to the financial responsibility of each individual risk.

Comprehensive general liability is based on the gross receipts of a Service Man's operation per year, and charged accordingly. This includes contractor's liability, products liability, vendors' liability, cars and trucks, and any other possible situation which would create suit against the assured. *Plate-glass* insurance will also be necessary where it is required. *Bailee bond*, which would cover customer's goods only while in transit by the Service Man, or while in his possession, may also be required. This bond will also cover loss of customers' goods due to the following: burglary, hold-up, fire and lightning, sprinkler leakage, tornado, windstorm, earthquake; and while in transit, for fire, hold-up, collision, over-turning of vehicles, flood, marine perils while on ferries, cyclone, tornado and windstorm. *Workmen's compensation* should be carried to cover injuries to employees while acting in behalf of the assured. *Public liability and property damage, comprehensive*, fire, theft and collision, where cars and trucks are concerned, should also be carried.

Other types of insurance that could be carried by the Service Man include: *Hold-up*, providing in-and-out custodian coverage which covers monies pertaining to business, also covers home of assured for burglary of business funds that may be kept there overnight; *monies and securities bond*, applied where large amounts of money are handled (it is ad-

(Continued on page 51)

* Based on data supplied by *Frederick W. Goldstein*, Insurance Broker.

Associations

ARTSNY

THE MAY ISSUE of the *ARTSNY News*, published by the Associated Radio-Television Servicemen of New York, featured a striking editorial by prexy Max Leibowitz, urging the sharing of information with other servicing-group members.

Liebowitz pointed out that: "We could also become the masters instead of the slaves of the servicing industry by simply sharing our little world with our fellow technicians. Now, perhaps as never before, we need one another desperately. . . . Let's help one another and thereby help ourselves by getting together today—*now*."

At a recent meeting of the group, members and guests discussed the following problems:

"Does the $1.00 per call plus parts type of advertising benefit business?"

"Is it necessary to advertise service within the hour, from 9 A.M. to midnight, seven days per week?"

"Is the independent Service Man type of business doomed by manufacturer's factory service, distributor's service, club type service plans, and part-time tinkerers?"

"Can the business relationship between the manufacturer, distributor and independent Service Man be improved?"

"Is the license bill passed by the City Council good or bad for the servicing industry?"

"What is your business worth on the open market?"

In an early issue of SERVICE there will appear a comprehensive report on the timely comments offered on these interesting queries.

FRSAP

THE SECOND EDITION of the *FRSAP News Letter*, published by the Federation of Radio Servicemen's Association of Pennsylvania, which is edited by Edward A. Lukas, has come off the press. Described are chapter activities, Federation news, and nationwide releases involving the Service Man.

Staff members of the paper are: Daniel Grant, assistant editor; Steven Martin, duplicator operator; and Charles Romane, distribution chief. The *News Letter* is published at 36 Krych St., Kingston, Pa.

TRT, K.C.

EVERY MONTH, according to *R. J. Samson*, executive secretary of the Television and Radio Technicians of Kansas City, news of TRT activities appear in the monthly journal of the Electric Association of Kansas City, in a section called *Scope*, edited by *A. M. Bullock*.

In recent issues appeared discussions about *uhf* and the Service Man and the construction of a *black box*, which makes it possible to feed several markers from separate signal sources without interference on the 'scope screen.

Describing how to build the *black box* *J. F. Lawrence* of the Jenkins Music Co., said that the sweep frequency signal goes through the TV receiver and may be attenuated at will with no effect on

marker gain, and as many markers as desired can be fed into a matching section to show at the proper frequency on the response curve on the 'scope. In the unit, the sweep frequency is fed into a matching unit and on out through a cable to sweep the TV receiver. Within the matching unit, Lawrence wrote, this sweep signal is tapped and fed into the detector unit. Markers are also fed into the matching unit and on into the detector unit; coming out of the detector unit then will be rather weak beat frequencies, one for each marker that falls within the sweep frequency range. These beats go into the amplifier unit. The 'scope will then display the waveform swept through the TV receiver, and on this response curve will be imposed the *of* beats coming from the amplifier unit. A gain control is used to put the markers at any desired amplitude.

RETA, B.C.

AT THE ANNUAL election of the Vancouver chapter of the Radio Electronic Technicians Association, affiliated with RETA, Ontario, Alberta, Manitoba and Saskatchewan, E. A. Mullins of New Westminster was named president; elected to the vice president post was F. Lewis of Vancouver; secretary, H. Amos; treasurer W. Wheatcroft, and recording secretary, R. T. Winstone, all of Vancouver. Retiring president J. A. Clarke became one of the 1952-53 provincial council delegates, the other two being E. A. Mullins and Roy Mah.

TEN YEARS AGO

BATTERIES NO LONGER AVAILABLE, OR DIFFICULT TO OBTAIN, because of the defense program, were described by Alfred A. Ghirardi. . . . Production difficulties, because of shortages, were evident in original receivers shipped from the factory. The Belmont model 6D14 provided for the use of either a *pm* or an *em* speaker. . . . Synthetic bass, permeability tuning and a combination broadcast-shortwave loop circuit, were among the chassis features analyzed. Ward's Airline models 14BR-734B and 14BR-735B 7-tube, 2-band *ac/dc* chassis were noted as having one type of synthetic bass in which a low-pass filter was connected between the first audio cathode and the power-tube cathode; three series resistors and two shunt capacitors appeared in a double T type filter. This receiver also used a shunt speaker field and screen grid regeneration in the 12SK7 *if* stage. The pilot lamp, connected across half the 35Z5GT filament in the usual manner, was shunted with a 150-ohm ⅓-watt resistor, to protect the rectifier filament in the event the pilot light blew out. This protection was achieved at the expense of some illumination. . . . Belmont's model 7D22 was described as having a broadcast loop and open-ended shortwave loop acting as a short standard antenna. This external antenna was connected to the loop primary which was shunted by a .00015-mfd capacitor for bypassing shortwave signals to a shortwave transformer. . . . Sam MacDonald of Philadelphia was elected prexy of The Reps. Irv Aaron of Milwaukee was elected vice prexy. . . . Paul V. Galvin was re-elected president of RMA . . . George Barbey was reelected prexy of NRPDA. The name for NRPDA was changed to National Electronic Distributors Association (NEDA). . . . National headquarters of RSA suspended for the duration of the war.

NEWS

Wilbur Burge, owner of Radio TB Supply, 4343 West Armitage Avenue, Chicago, receiving gold-plated 2½-millionth Radion antenna from Ralph Leonard, Radion's prexy. Burge was the first distributor to place an order with Radion for antennas. At that time he was with Walker-Jimieson, Inc.

J. A. MILLING BECOMES SAM'S V-P

J. A. Milling, formerly director of the electronics division of NPA, Washington, has been named executive vice president and general manager of Howard W. Sams and Co., Inc., Indianapolis, Ind.

Milling has also been elected to the board of directors, and will be in charge of the firm's expansion program in behalf of Photofact Publications and allied enterprises in the electronics field.

Milling was formerly operating v-p at RCA Service Co.

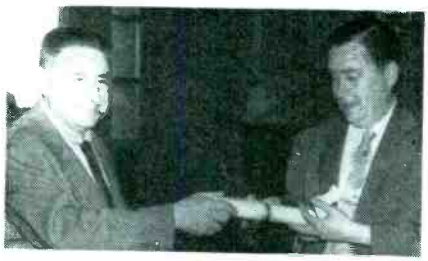
J. A. Milling

Adrian S. Price

ADRIAN S. PRICE JOINS RMS

Adrian S. Price, formerly director of public relations for the Dexter Chemical Corp., has been appointed director of public relations and advertising for Radio Merchandise Sales, Inc., 2016 Bronxdale Ave., New York, N. Y.

R. L. Triplett, president of Triplett Electrical Instrument Co., receiving gold watch from his sales force, commemorating his fiftieth year in the electrical measuring instrument industry. Making the presentation is E. K. Seyd, left, Andover, Conn., 20-year Triplett sales veteran. Looking on: A. D. Plamondon, Jr., president of Indiana Steel Product Company, Valparaiso, Indiana, and vice president of RTMA, of which Mr. Triplett is also a director.



At Clarostat banquet on the eve of the opening of the Radio Parts Show in Chicago, when Victor Mucher (right), president of Clarostat Mfg. Co., Dover, N. H., and Austin C. Lescarboura, its advertising counsel who operates his own agency at Croton-on-Hudson, N. Y., received 25-year gold wrist watches as well as testimonial scrolls carrying the signatures of fellow Clarostaters, in appreciation of their quarter-century association with the company.

DR. DUMONT HONORED BY FRENCH GOVERNMENT

The French Government, through Jean de Lagarde, Consul-General in New York, recently conferred the rank of Chevalier in the National Order of the Legion of Honor on Dr. Allen B. DuMont, president of Allen B. DuMont Laboratories, Inc., Clifton, N. J.

Honor was bestowed on Dr. Du Mont in recognition of the outstanding service he rendered to the Allied cause during World War II.

* * *

PENFIELD NAMED AD MANAGER OF SYLVANIA ELECTRIC DIVISIONS

Robert A. Penfield has been appointed ad manager of the Radio and Television Picture Tube Division, Electronics, Parts, and Tungsten and Chemical Divisions of Sylvania Electric.

Penfield joined Sylvania in March '47 as editor of the *Sylvania News*. In July, '51 he was named ad supervisor of the company's tube division in New York.

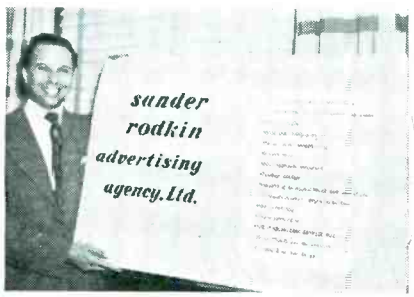
Robert A. Penfield

* * *

J. H. ROBINSON NOW RADIO ESSENTIALS PREXY

J. H. Robinson, has been named president of Radio Essentials, Inc., a subsidiary of American Radio Hardware Co., Inc., 152-4 MacQuestan Parkway, South, Mount Vernon, N. Y.

Sander Rodkin, head of Chicago ad agency, specializing in electronic-TV accounts, in room which provided relaxation quarters for clients, members of the press and visitors during Parts Show. On view were displays of the agency's work.



Tools . . . Instruments Parts . . .

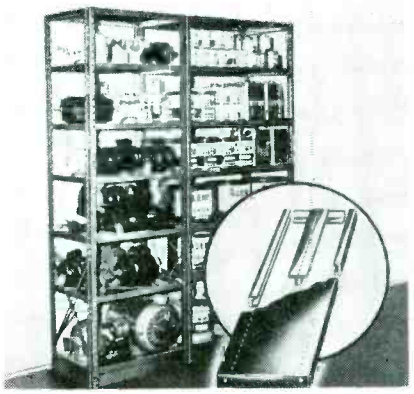
EQUIPTO IRON-GRIP SHELVING

A line of *iron-grip shelving* designed to hold up to 2000 pounds on each individual shelf, has been announced by Equipto, Division of Aurora Equipment Co., Aurora, Ill.

Reinforced sides and center of shelves are equipped with 1" x 1" high carbon angle irons, ⅛" thick. Front and rear have U-shaped reinforcing channels.

Iron-grip studs are used; studs slip into a hole in the shelf and then into a keyhole in the upright. The shelf is then pressed down and assembly is complete. A slope in the stud combines with the slope in the keyhole to form a tight grip.

All shelving is instantly adjustable on 1½" centers. All openings are 100% adjustable from front of units. Dividers, drawers, backs and side panels are available in all sizes.



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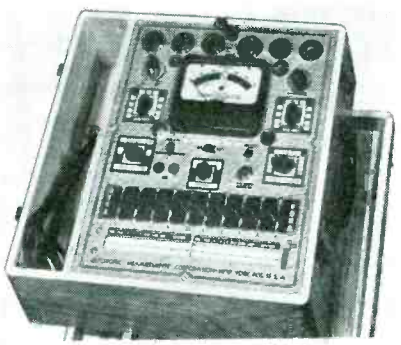
E-M TUBE TESTER

mutual-conductance tube tester, *model 206*, designed to give micromho readings for all amplifier tubes, has been announced by the Electronic Measurements Corp., 280 Lafayette St., New York, N. Y. Also tests cold cathodes, magic eyes, voltage regulators and ballasts, from .75 to 117 filament volts.

Flexible lever switching is said to allow all present and future tubes to be tested regardless of location of elements on tube base. Individual sockets for each tube base type are also provided.



EICO AUDIO GENERATOR KIT

A sine and square-wave audio generator, model 377, in kit and wired form, has been announced by Electronic Instrument Co., Inc., 84 Withers St., Brooklyn 11, N. Y.

Sine-wave coverage is from 20-200,000 cycles in four ranges. Square wave coverage, from 60-10,000 cycles (5% overshoot at 10 kc) is read on same scales as the sine-wave. Response is said to be 1.5 db from 60 cycles to 150 kc, and distortion only 1 per cent of rated output. Features use of a *Wien* bridge-type oscillator and a cathode-follower output.

* * *

TRU-PINE PLASTIC COATING

A clear acrylic plastic coating, *Spray-a-cry*, packaged in a self-spraying container, has been developed by True-Pine Co., 7638 Vincennes Ave., Chicago, Ill.

Coating is said to be quick drying, and is claimed to provide a flexible and durable finish that resists oils, alcohol, grease, acids, water and dirt.

PYRAMID TUBULAR CAPACITORS

Tubular paper capacitors, *Imps*, molded of a thermosetting plastic which is said to be impervious to moisture and capable of operating at temperatures ranging from —40° to +100° *C*, and incorporating tinned copper leads, have been announced by Pyramid Electric Co., 1445 Hudson Blvd., North Bergen, N. J.

Each section is non-inductively wound, and is available in capacitance values ranging from .00025 mfd to .5 mfd in 200 and 400-volt ratings, and from .00025 mfd to .25 mfd in a 600-volt rating.

* * *

IDC STABELEX CAPACITORS

Capacitors, *Stabelex D* type, that it is said will hold their charge for as much as 200 days or longer, have been developed by Industrial Condenser Corp., 3243 North California Ave., Chicago 18, Ill.

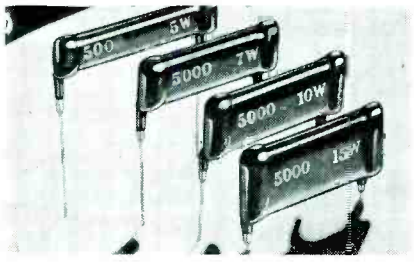
Features claimed are change in capacity from +20° to —80° C, +0.8%; power factor at 20° *C*, measured at 1 kc, 0.00025; insulation resistance at 20° *C*, 900,000 megohms mfd.; *Q* at 20° C, measured at 10 kc, 10,000.

* * *

H-H WIREWOUND RESISTOR

A wire-wound resistor, *Hall-Ohm*, featuring a coating that it is said will not chip or flake, and provide excellent surface radiation, resulting in a high rate of heat dissipation, has been announced by Hamilton-Hall Manufacturing Co., 227 N. Water St., Milwaukee, Wis.

Resistors are available up to 25,000 ohms and up to 20 watts dissipation.



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HOWARD LUMOMETER

A neon-bulb checker, *Lumometer* type *S100*, that is said to test for opens, shorts and continuity, has been announced by the Howard Sales Co., 539 Atlantic Ave., Brooklyn, N. Y.

Instrument is said to test radio and TV tubes, picture tubes, transformers (power, *af* and *rf*), ignition coils, heaters, bulbs, speakers, circuit wiring, and capacitors as low as .000025 mfd. May also be used as an *ac* or *dc*-voltage tester from 70-750 volts.

COLUMBIA PORTABLE WINDING TESTER

A portable electronic winding tester, *PMD Tester*, that is said to be able to detect a single shorted turn of No. 40 *awg* wire, has been announced by Columbia Technical Corp., 5 East 57th St., New York 22, N. Y.

Test probes generate their own field oscillations at 800 cycles. Rod-like single probes are used to test distributed windings.

Motor tester consists of a power supply unit, vacuum-tube oscillator, a regulator and rectifier circuit.

WARD SELF-MOUNTING RESISTOR

A self-mounting resistor, *Axiohm*, that is said to require no supports when installing, has been announced by Ward Leonard Electric Co., 31 South St., Mt. Vernon, N. Y.

Leads are made of a low-resistance alloy, tinned or untinned, and are anchored to resistant element and tube. Resistance element, coating, ceramic tube and leads are said to withstand temperature as high as 340° *C*, through the use of an enamel coating.

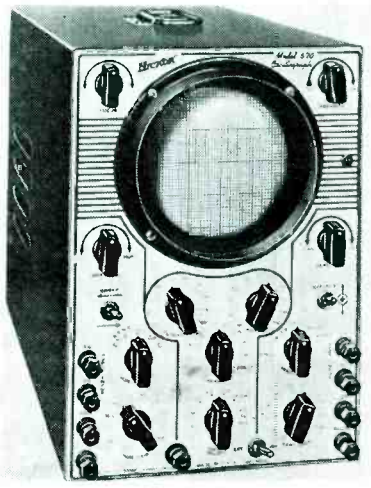
Available in 1 to 10,000 ohms (5 watts) and 1 to 50,000 ohms (10 watts), with a standard resistance tolerance of ±10 per cent.

TV Parts . . . Accessories

HICKOK 5-INCH 'SCOPE

A 5-inch 'scope, model 670, with a sensitivity of 10 millivolts *rms* per inch, that is said to permit visual testing and alignment of AM, FM and TV chassis when used with a frequency-modulated *rf* oscillator or sweep generator, has been announced by the Hickok Electrical Instrument Co., 10521 Dupont Ave., Cleveland 8, Ohio.

Frequency ranges include: vertical amplifier, *dc* to 500 kc, down 3 db, usable to beyond 2 mc, pulse rise time 0.6 microsecond; horizontal amplifier, 0-250 kc, pulse rise time 1.2 microseconds; and fixed sweep frequencies, 30 to 7875 cycles.



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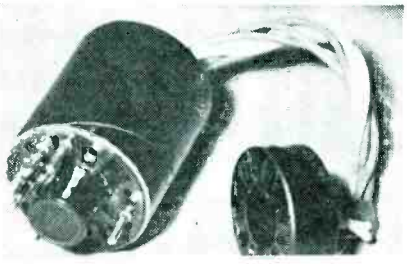
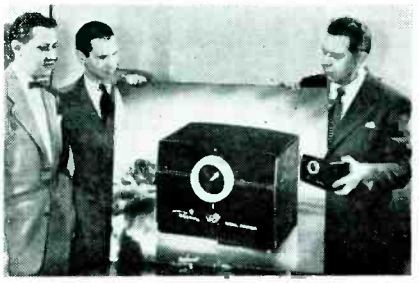
VIDAIRE PICTURE TUBE BRIGHTNER-REJUVENATOR

A picture tube brightener and rejuvenator, *Kine-Lite*, that may be used on tubes 10" to 30", has been introduced by Vidaire Electronics Manufacturing Co., Lynbrook, N. Y.



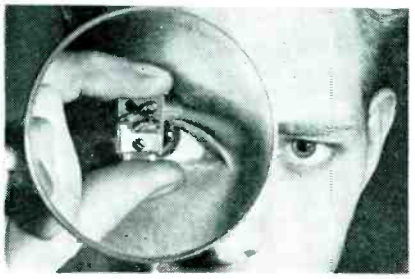
REGENCY BOOSTER REDESIGNED

A TV signal booster, model *DB-520*, that has been redesigned, and features a circuit stabilizer that is said to provide both inductive and capacitive neutralization, has been announced by I.D.E.A., Inc., Regency Division, 7900 Pendleton Pike, Indianapolis 26, Ind. Redesigned model's case has been enlarged, tuning and control dials incorporated into one knob, and cabinet evolved to blend with either period or contemporary TV sets.



Designers David Painter, James Teague and Victor Petertil examining a production model of the new Regency signal booster.

Circuit stabilizer (pat. applied for) incorporated in the Regency model DB-520 signal booster that is hardly larger than a man's thumb nail.



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BELDEN 300-OHM LEADIN

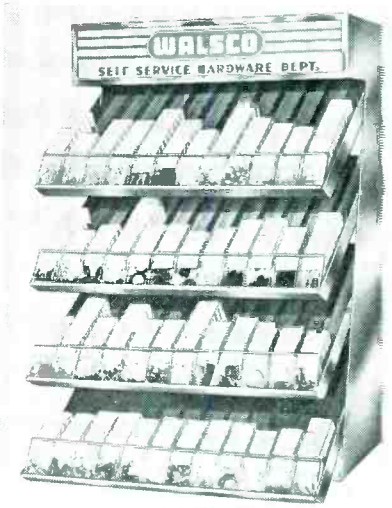
A 300-ohm transmission line, *Weldohm*, that is said to be 254 per cent more flexible and 162 per cent stronger than present leadins, has been developed by Belden Manufacturing Co., Chicago, Ill.

Made of 20-gauge 7 x 28 copper-clad steel, line has an outside diameter of .072" x .444", and is available in spools of 100', 500' and 1,000'.

WALSCO HARDWARE IN PLASTIC-CONTAINERS

Plastic containers are used to display the new *50* line of radio and TV hardware, which has been announced by the Walter L. Schott Co., 3225 Exposition Pl., Los Angeles, Calif.

Containers can be stacked, and are provided with a sliding lid.



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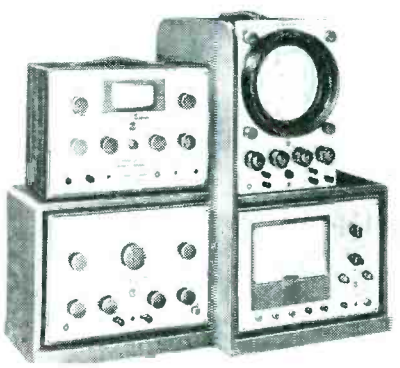
RCA TV TEST EQUIPMENT RACK

A double-tier four-section rack, designed to consolidate major TV test instruments in a single test location, has been announced by the tube department of the RCA Victor Division, Harrison, N. J.

Constructed of wood, rack is available to radio Service Men through RCA test equipment distributors.

Rack has been designed to accommodate RCA's TV test instruments, including the *WR-39C* calibrator, *WR-59B* sweep generator, *WO-56A* 'scope, and the *WV-87A* master VoltOhmyst.



CLAROSTAT TV BALLAST RESISTOR

A TV ballast resistor, designed primarily to be plugged in between TV set and electric receptacle, for use where line voltage tends to increase up to 140, has been introduced by Clarostat. Available in type *TVA*, 200 to 300 watts; and type *TVB*, 300 to 375 watts.

Unit operates on the ballast principle, whereby, as voltage increases, the resistance increases, giving an increased drop across the resistance, thus allowing a lower potential to be applied to the set. At 110 volts and under, the voltage drop is negligible; but with increases up to 140 volts, the voltage applied to the chassis will, it is said, not normally increase much above 115, depending on load applied.

RAM FERRITE-CORE AUTOTRANSFORMERS

A ferrite-core horizontal output autotransformer, *X069*, designed as a direct replacement in Stromberg Carlson and G. E. TV sets, has been announced by Ram Electronics Sales Co., Irvington-on-Hudson, N. Y.

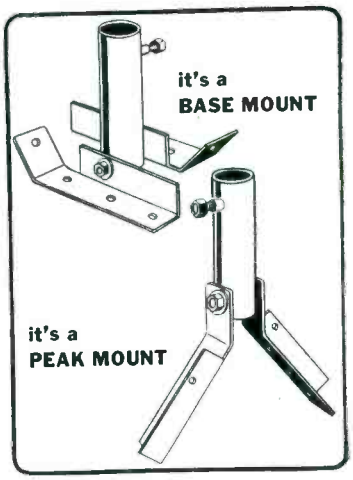
Component is said to feature low retrace time and deliver 16-17.5 kv for 19- to 21-inch picture tubes. Model *X069* is recommended for use with model *X70F14* 14-mh cosine deflection yokes.

CHANNEL MASTER MOUNT

A mount, *Peak-N-Base*, that consists of three components which may be assembled either as a base mount or an adjustable peak mount, has been introduced by the Channel Master Corp., Ellenville, N. Y.

Hardware, one bolt and nut, is used to assemble either type of mount. Mast is held in place in a heavy gauge steel cylinder with a locking bolt to prevent mast movement. Locking device features spot-welding on the inside of the cylinder.

Mount may be used with all types of masts up to 2" od.



Channel Master Peak-N-Base

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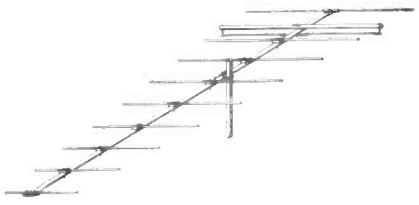
TACO FRINGE-AREA 10-ELEMENT ANTENNA

A fringe-area type 10-element antenna, *Silver Streak*, available in single or stacked arrays, has been announced by the Technical Appliance Corp., Sherburne, N. Y.

Single bay is said to provide a gain of 11 db. Antenna incorporates eight directors, a two-diameter driven element, and reflector.



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TELREX BAT WING ANTENNA

An indoor antenna, *Bat Wing*, for TV, *uhf* and FM, has been introduced by Telrex, Inc., Asbury Park, N. J.

Antenna is said to require no tuning or pruning. Aluminum elements are mounted on a tip-proof base.

UHF TV Antennas

(*Continued from page 22*)

or interference are present, and the antennas must have good directivity characteristics, it has been found that the corner reflector antenna is very satisfactory, providing greater gain for low signal areas. In areas where high gain and directivity are desired for single-station reception, the yagi antenna has been found to be a necessity.

Triangular Dipole

The *uhf* broadband triangular dipole, noted as probably the simplest and least expensive type of antenna, was described as a two-element affair made from hard aluminum stampings. It was said that other materials, such as wire screen or metal rods, could be used, providing the conductor spacings are small in comparison to a wavelength. Continuing his construction analysis, Johnson said that the elements are supported near their centers by a *U*-shaped piece of insulating material; a similarly constructed metal support could be used with a slight reduction of antenna gain. This method of supporting the antenna was used because it was found to minimize the effects of rain, snow, and ice by providing a long parallel high-impedance path.

The impedance characteristics were described as controllable over certain limits, via a change in the dipole angle. To provide the best match, the dipole should have an average impedance of 280 ohms, for the so-called 300-ohm tubular twinlead transmission lines commercially available.

To obtain greater vertical directivity and gain several units may be stacked.

Broadband Stacked V Antennas

In an analysis of another *uhf* antenna, the broadband stacked-*V* type, the RCA specialist said these antenna elements had a diameter of 0.4″, a length of 55″, and an included angle of 50°. This antenna was said to provide excellent gain. The antenna elements must have low inertia and high rigidity to reduce vibration and the resultant signal modulation in high winds. Reviewing the stacking[2] possibilities of these antennas, Johnson said that they should be stacked approximately ½ wavelength apart, at the lowest operating frequency, and connected with a 300-ohm tubular leadin which serves as a phasing and matching network; the 300-ohm line is connected to the center of the phasing section. The gain of the *V* antenna was said to increase almost linearly with frequency, ading in overcoming propagation and other losses, and helping, too, to maintain a constant input voltage for the receiver on all channels.

[2]Stacking has been found helpful in reducing the effects of ground reflections, making the antenna positioning for minimum reflections less critical.

Length of Antenna Elements

In a discussion of the gain of the *V* antenna it was said that length controls this condition, gain increasing rapidly until the elements are about 3 waves long; thereafter the rate of increase becomes less. At 450 mc three waves were said to be approximately 78″, a length that should be a good choice for high gain and minimum materials, but experience has proven that 55″ is about the longest practical length which can be supported at one end, with sufficient rigidity to prevent wind modulation. The shorter length was found to be more practical, too, since in some areas where reflections

(*Continued on page 48*)

(*Continued from page 47*)

are present an antenna of small dimensions will, usually, perform as well as a larger antenna.

Broadband Rhombics

Reporting on a third type of *uhf* antenna, the rhombic, Johnson said that the elements here have a diameter of .4", a length of 55", an included angle of 50°, and a 470-ohm terminating resistance. It was noted that the dimensions and included angle were identical to those determined for the dual *V* because the included angle and element relationship necessary to produce a maximum forward lobe with the *V* antenna remain essentially the same for the rhombic. The outstanding characteristic of the rhombic, one of the most widely used types commercially for point-to-point communication service, is its ability to produce narrow beam horizontal directivity patterns over a wide frequency range. It was said to be simple to construct, offer good gain, operate over a wide frequency range, and not critical as to dimensions or adjustments.

Declaring that the gain of a rhombic rises at a rapid and uniform rate with increasing frequency, the *uhf* expert noted that this was a distinct advantage since it helped to overcome propagation and other losses that become greater as the fequency increases. However, it was emphasized, the rising gain characteristic provided by the rhombic would be insufficient to maintain a constant voltage across the input terminals of a receiver; the input impedance of a properly terminated rhombic is relatively independent of frequency. It was then pointed out that the input impedance of a transmission line terminated in its characteristic impedance is equal to this characteristic impedance for all frequencies. Accordingly, if this transmission line is separated in such a manner as to form the terminated rhombic, the input impedance is changed because the configuration of the conductors is different. As a result, it was said, the input impedance is no longer independent of frequency; however, by careful adjustment of the termination it is possible to obtain an input impedance which fluctuates very little with frequency.

Corner Reflectors

Detailing the characteristics of the fourth *uhf* antenna, the corner reflector, Johnson said that the reflector grids used in this type have an included angle of 90° and are made from hard aluminum tubes; however, other materials such as wire fencing

could be used, providing the wire spacing was small in comparison to a wavelength. The triangular dipole elements, bent forward along their axis at an included angle of 90°, were noted as being supported near their centers with ceramic insulators to minimize the effects of rain, snow, and ice, by providing a long, high-impedance path shunting the antenna.

In a review of the experiments made with these antennas, it was pointed out that a 90° corner reflector of larger than theoretical optimum dimensions was constructed from solid copper sheet and used for the determination of the antenna shape and dimensions. The broadband triangular dipole, which provides gain on all of the *uhf* channels, was noted as suggesting a logical choice of antenna to be used with the corner reflector, except that its size was so great that it could not be located within the reflector. It was necessary to determine an antenna configuration and size, which would provide a minimum of shielding and shunt capacity to the corner reflector. The antenna was bent 90° along its axis, thereby reducing its capacitance to the reflector, even below that of a cone in the same location. The triangular dipole length and angle were then determined by power gain measurements on several antennas of various angles and lengths. It was revealed that these measurements showed that an angle of 40° before bending, and an overall length of 14¼" provided the greatest average gain throughout the *uhf* spectrum.

When plotting the effect of gain variation as a function of grid width at 500, 700 and 900 mc, it was noticed that the gain of the antenna was not a direct function of the corner reflector width. When the reflector was extended far beyond the antenna length, little of the reflected energy could be utilized. The curves for 700 and 900 mc indicated that beyond a width of 25", the reflector becomes inefficient. The curve for 500 mc showed that the gain continued to increase, as the reflector was extended beyond 25". However, Johnson said, it was felt that economic considerations would not warrant an increase in reflector width, which would affect only the lower frequencies. Therefore, a 25-inch reflector width was selected for commercial uses.

Six-Element Yagis

Reporting on the fifth type of antenna which can be used for the ultra-highs, the six-element yagi, Johnson declared that these antennas have excellent gain and directivity over a limited bandwidth. The manufacturing cost was noted as being low due to the small amount of material required and simple construction. In the model tested, the driven element was designed for use with 300-ohm tubular transmission line; it consisted of a folded dipole made from ⅛" diameter rod, while the folded portion was a ¼" diameter rod. This ratio of diameters was said to be necessary to provide the proper antenna impedance. The ⅜" diameter mast was large in comparison to the antenna size and had to be located some distance from the antenna element so as not to affect the gain and directivity characteristics.

In constructing a yagi for the *uhfs*, a wood crossarm element support had to be used, because a metal crossarm of sufficient diameter to support the elements was found to become an appreciable precentage of a wavelength, modifying the element lengths. The element lengths were noted as depending upon the shape of the crossarm selected and method used for attaching to such an extent that actually the final design must be determined after the antenna has been fabricated. For optimum gain it was found that the lengths must be adjusted to within ±1/32". Plots taken indicated the yagi's narrow bandwidth was suffi-

(*Continued on page* 50)

cient to accommodate 6 adjacent channels on the low frequency end of the band, and 12 on the high.

Amplifiers for UHF Distribution Systems

In another report[1] on the potentialities of master-feed systems on *uhf*, T. Murakami, also of RCA, revealed that the use of ultrahigh amplifiers in antenna distribution systems will be of prime importance, whether they be used for apartment buildings, in receiver factories, or for demonstration purposes. These amplifiers will serve to improve the signal-to-noise ratio in weak signal locations, amplify the available power from the antenna so that a number of receivers can be fed and make it possible to use pads in series with the receivers to reduce interaction between receivers without degrading picture quality due to reduction of input signal.

Of the amplifier types studied, it was noted that the grounded-grid triode amplifier appeared to be the most satisfactory for single channels.

Describing an experimental distribution amplifier using a 5876 pencil triode and a lumped constant type of double tuned circuit, Murakami said that a copper heat radiating element was used on the plate of the tube to keep the metal to glass seal temperature within the rated value. A 3-30-mmfd ceramic trimmer was included to tune the cathode circuit. The plate circuit was series tuned with a lumped inductance and a 0.3 to 3-mmfd trimmer. The inductance element was said to consist of 5 turns of copper strap 3/32" wide and .010" thick wound on a 3/16" diameter form. The output coil was similar with a tap on the coil for the low impedance output.

In a review of the methods that may be used to distribute the power from the amplifier to several different loads, it was said that quarter wave sections of coax lines can be used. Quarter-wave sections of 52-ohm line have been used to transform the 73-ohm impedance of the output circuit to 36 ohms so that two 73 ohm loads could be fed in parallel. A quarter-wave section of 73-ohm line can also be used to feed two 73-ohm loads in parallel. When the quarter-wave line is terminated in this manner, it was shown, the impedance at the other end becomes 146 ohms; if two such terminated lines are placed in parallel they can be fed from a 73-ohm source.

According to Murakami, new tubes such as a low noise traveling wave type with a large gain-bandwidth factor may result in the design of a broad-band amplifier distribution system.

Business Aids

(*Continued from page 37*)

visable to have this coverage, which covers loss and disappearance of monies for any reason); *use and occupancy*, also known as *business interruption*, as well as *rental* insurance, and *betterments and improvements*—an interesting type of insurance, which in case of a fire, would put an assured out of business for any length of time, would take care of all annual salaries, profits, expenses pertaining to each individual risk; *cargo insurance*, covering shipments of products by truck or any other means of transportation; *credit insurance*, to protect the assured against loss in expanding credit to unknown accounts; and *water damage*, for use in certain instances.

The foregoing types of insurance would cover most any sized risk regarding casualty or fire. There are, however, other types of insurance which are just as important to businesses: *Partnership insurance*, which is a form of life insurance, preventing automatic liquidation in the event of the death of a partner, could be considered; in an *individual ownership*, such coverage could be carried to cover depreciation due to federal taxes, inheritance tax, state tax, and other various items that cause depreciation of a Service Man's holdings, so that his family can maintain their same level of income as before the demise of the breadwinner. Life insurance can also be purchased for the purpose of a *depreciation account*, to replace machinery and tools over long or short term periods. Also, forms of life insurance can be set up for the purpose of business protection and retirement and credit, as well as to amortize mortgages and to protect them.

It is advisable to take time out to investigate the company you are dealing with, before placing insurance with any broker or company, and request a broker or agent to explain the policy in the average layman's language, including the *fine print*, so that you will know what you are paying for and what protection you have. Another good point to remember when buying insurance is avoid having all policies come due on one date; this may place you in financial hardship at one time, and policies should therefore be staggered.

Sincerely,

DON KAY

Audio

(*Continued from page 33*)

ground level at a symphony concert just before the orchestra begins to play, while the high end of 136 db was beyond the threshold of pain.

The negative feedback from the meter circuit to the second stage was said to maintain the gain of the amplifier reasonably independent of normal changes in battery voltage and aging of tubes. This stabilization, it was pointed out, makes it practical to dispense with the usual gain adjustments. However, an internal adjustment is provided, if tube replacements make it necessary.

Peterson said that the current feedback also provides a high impedance source for the rectifier-type meter. Thus, the resultant meter current is very closely proportional to the rectified average value of the signal, over the full calibrated range of the meter, with little dependence on temperature and individual rectifier characteristics.

SS Meter Uses

Reviewing the application capabilities of the *ss* meter, Peterson noted that audio men should find the meter very useful for custom audio installations. For instance, in a two- or three-way speaker system it is desirable to adjust the relative levels for the different speakers for the smoothest response. While, it was said, this adjustment can be done approximately by ear, it is generally more satisfactory to use a sound-survey meter. The setting of the initial reference level for a compensated volume control can also be done by sound-survey meter measurement. The dynamic range of an audio system can also be checked with the meter, Peterson said.

In a commentary on bass-reflex system control, the *ss*-meter expert said that the marked low-frequency resonance effects can usually be eliminated by making minor modifications, such as stiffening the structure, adding some damping material, and changing the port opening. It was pointed out that the sound-survey meter, in conjunction with an audio oscillator, will permit quantitative measurements of the progress made by these modifications, and the steps can be made in an orderly fashion. If the measurements are made in a live room, for example the living room in which the speaker is to be used, Peterson continued, it is usually desirable at each frequency to take the average level of readings in several different locations in the room.

TVI

(*Continued from page 21*)

said that the set rarely can be correctly adjusted to reject interference unless the adjustment is made while the interference is taking place. He described the communications receiver, capable of tuning through the *if* of great assistance when servicing a receiver which is being interfered with because of poor *if* rejection. It will reveal whether or not the interfering signal is in or near the *if* band, and, whether the receiver requires *if* traps or added shielding, if the signal causing the interference is being transmitted on or near the *if*.

The opening of the new amateur 21-mc band has caused quite a bit of newspaper publicity recently. Rand related his experiences on this band, since the FCC granted him an experimental license, K2XBH, for the specific purpose of investigating the possibilities of TVI when this band was opened.

Test transmissions were put out at intervals during the summer, at first without warning and later with newspaper publicity. Of four spot frequencies authorized by FCC, 21.235 mc was used for most of the work because it was closest to 21.25; this is the *if* that had been selected by one of the largest TV receiver manufacturers in the early days for its sound *if*, while most of the others were near 21.9. The tests revealed that receivers having a 21.25-mc sound *if* reported interference at distances up to three miles from the transmitter. Receivers having a sound *if* of 21.9 mc did not get interference, even at a distance of a few hundred yards. In every case, no matter what the *if*, the interference was in the sound channel alone; there was no interference with the picture. At a distance of a quarter mile or more, traps or highpass filters in the receiving antenna leads eliminated the interference on the 21.25 chassis, but those sets closer still suffered from TVI.

[To Be Continued]

Ser-Cuits

(*Continued from page 25*)

tuner which attenuates all frequencies below 50 mc. The filter is mounted directly behind the tuner and serves to reject interference resulting from amateur and police transmissions, as well as interference resulting from many types of industrial equipment. The head end of the chassis features a switch-type turret tuner with an extremely low noise figure. A twin-triode 6BK7 is used as a two-stage cascode *rf* amplifier, followed by a twin-triode 6J6 used for the oscillator and mixing functions.

The tuner can be adapted for *uhf* by substituting a set of *uhf* coil strips in place of any of the unused *vhf* channel strips.

The tuner output is fed to the input of a 4-stage intercarrier *if* amplifier, via a plug-in 75-ohm coax coupling link. Use of plug-in connections has been found to simplify servicing, and permit field installation of a special adjacent channel rejection filter in areas where adjacent channel interference creates a reception problem.

This special band-pass filter, an M-derived type, is connected between the output of the tuner and the input to the video *if* strip, and snaps into two special chassis slots which have been provided for this purpose. All connections are of the plug-in type and no soldering or circuit changes are necessary.

The video *if* amplifier employs a video *if* of 45.75 mc which offers a number of definite advantages as compared to the 25 mc *if*s which were formerly employed:

(*1*) Use of the higher frequency *if*s has been found to result in a great reduction in the number of internally generated *if* harmonics which can fall within the pass bands of the *vhf* channels. These harmonics may be picked up and fed back to the tuner causing annoying *beat* interferences.

(*2*) Image rejection characteristics are greatly improved, particularly in the *uhf* band.

(*3*) External interference problems which are troublesome when using lower *if* frequencies (i.e., *diathermy*) are greatly minimized.

(*4*) The high-frequency *if*s reduces the possibility of interference with neighboring TV receivers, because most of the local oscillator frequencies fall outside of the *vhf* channels.

[To Be Continued]

Service Helps

(*Continued from page* 34)

ployed. These are commonly known as reactivation and brightening.

In the reactivation method the cathode is heated intensely from an external source (such as by applying twice normal filament voltage) 1 to 3 minutes, which is called flashing, and it is then glowed from 5 to 50 minutes, also at a very high activation temperature. This method reforms the molecular thorium layer on the cathode which reduces the work that an electron must do to escape.

In the brightening method slightly more than normal heating of the cathode is permanently provided so that the kinetic energy of the electrons in the cathode is increased and they thereby can escape more easily.

In one study of the latter method, it was found that the falling off of emission after reactivation was immediate and often from 2 to 3 times faster than in brightening.

The probe also disclosed that tube failure occurred in 8% of the tubes reactivated due to the voltages involved, but no failures occurred in over 150 tests in brightening. It was found that the reactivation process had to be repeated in several cases to obtain increased emission when the first processing did not take.

TV tube *brighteners** are essentially filament transformers with several taps to increase the filament supply power of the picture tube with appropriate switches for adjustment and for automatic or and off. When in operation the television set leads for the picture tube filament is loaded by resistance and therefore is adapted for series or parallel-filament arrangements. This also actuates a therm-switch which automatically turns the *brightener* on and off with the set. In addition this automatically removes power from the unit when the interlock of the television set is opened.

*From Perma-Power technical data notes.

Fig. 2. TV tube brightener.

The filament transformer taps provide normal 6.3 volts, and 6.8, 7.25, and 7.8 volts.

The 6.3-volt tap is provided so that this unit can remain in the set when a new tube is installed and is available for immediate reuse. In addition it allows the *brightener* to be used on a new tube with a cathode-filament short and relieve the condition.

In the cathode-filament short the cathode is grounded into the filament string—in series filaments to one side of the line; in parallel strings through a grounded center tap on the power transformer filament winding or to ground if all filaments have one side grounded. In this condition the cathode is at 0 volts rather than slightly negative controlled by the brightness control of the set. A more-than-normal bright picture occurs which cannot be controlled. With the *brightener* the cathode is merely grounded into the unit allowing the TV set circuit to respond normally. When *brighteners** are used to relieve cathode-filament shorts they should be set in the *normal* position and tube life will not be affected.

Tube News

(*Continued from page 31*)

mmfd between *B+* and the chassis may be helpful. Small *rf* chokes in other leads to the damper tube at the socket usually decrease the radiation further. When these steps are taken, virtually the only sources of radiation will be the elements of the damper tube itself. It is important, therefore, that the high-voltage enclosure in which the damper tube is located provide adequate shielding from the rest of the receiver, and that coupling between the damper tube and leads which come out of the enclosure be minimized.

New Tubes

A multi-unit tube of the 9-pin miniature type, 19X8**, a 19-volt version of the 6X8, containing a medium-mu triode and a sharp-cutoff pentode in one envelope, has been developed. It was designed for use as a combined oscillator and mixer tube in transformerless AM/FM receivers. The tube has a 150-ma heater which permits series-string heater operation with other tubes having 150-ma heaters.

The pentode mixer unit of the 19X8 is said to provide low grid *1*-to-plate capacitance as compared with a triode mixer, and also low output capacitance. The low value of capacitance between grid *1* and plate minimizes feedback problems often encountered in mixer circuits operating into high-impedance plate loads. The low value of output capacitance enables the tube to work into a high-impedance plate circuit with resultant increase in mixer gain.

In the AM section, the pentode unit may be used as a pentode mixer to provide high gain; in the FM section, the pentode unit may be used either as a pentode mixer or as a triode-connected mixer, depending on signal-to-noise considerations. Because triode mixers have relatively low equivalent noise resistance, they are preferred for receiver designs which do not include an *rf* stage. For receiver designs with an *rf* stage, a pentode mixer not only provides higher gain, but better performance because in such designs the noise introduced by the mixer is negligible. For both the AM and the FM sections, the triode unit of the 19X8 is claimed to make a satisfactory oscillator.

**RCA.

JOTS AND FLASHES

THE TREND to the development and production of larger and larger picture tubes, which it was felt would halt generally with 24" types, is instead in full bloom now. During the next few months there will appear many chassis with 27" types, which oddly enough, in many cases, will be shorter than the 21" tubes in current chassis. . . . An increase of 18-million TV receivers in American homes during the next four years was predicted recently by *Dr. Allen B. DuMont*. . . . *Glen McDaniel* has resigned as RTMA president. No successor to McDaniel has been elected, but the new chairman of the board, *A. D. Plamondon, Jr.*, has appointed a committee consisting of past presidents to make recommendations for a new president. The committee consists of Robert C. Sprague, chairman; Max F. Balcom, Paul V. Galvin and Leslie F. Muter. . . . Pilot Radio Corp. has appointed *Adolph L. Gross Associates Inc.*, 45 W. 45th St., N.Y.C., as exclusive national sales reps for a line of high-fidelity AM-FM radio tuners and amplifiers. . . . *Sherman E. Pate*, prexy of Permo Inc., has announced that the Fidelitone line of products will continue to be handled by direct factory men. The Permo line, presently consisting of 113 special type needles, magnetic recording wire and tape, and record brushes, will be handled by independent manufacturers' reps. . . . The picture-tube division of the DuMont Labs, Clifton, N. J., has announced a new sales campaign in the replacement field, which will be carried to Service Men through full-page two-color ads, point-of-sales aids (at distributors) in the form of large two-color blowups of these ads, and a selection of tags to be hung on the knobs of serviced receivers citing the advantages of picture-tube replacement. . . . *John F. Rider* was guest speaker at George Washington Vocational high school graduating exercises recently, addressing more than 300 graduates and guests. . . . The *Sarkes Tarzian* rectifier division is adding approximately 3,000 square feet to its present facilities for research and engineering work. . . . *Hytron's* executive and sales offices have been transferred to its new plant at Endicott St., Danvers, Mass.: the Salem address, 76 Lafayette St., is being used for mail. . . . To familiarize the independent parts distributor with the problems his customers will face with the advent of *uhf*, NEDA will feature a practical discussion of *uhf* at one of the educational sessions of the '52 convention and manufacturers' conference in Atlantic City, September 22-25. . . . *Hal F. Bersche*, manager renewal sales, RCA tube department, is scheduled as one of the principal speakers on *UHF In Your Future* at the NEDA conference. . . . *Peter L. Jensen*, prexy of Jensen Industries, Inc., sailed last month on the Queen Mary for an extended look at business conditions in Europe. . . . Every guest room in the new *Statler Center* in Los Angeles will have TV as part of its regular service. To bring TV to its patrons, the hotel is purchasing 1300 17-inch RCA chassis. . . . *David H. Ormont* has been named prexy of the Hudson Radio and TV Corp., 48 W. 48th St., New York 36, N. Y. . . . *Sol Baxt* has been named vice prexy and *Joseph Simons*, secretary. . . . *Ajax Condenser Co.* has opened a west coast factory and office at 10905 Chandler Blvd., North Hollywood, **Calif.**

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SERVICE INDEX—JULY, 1952

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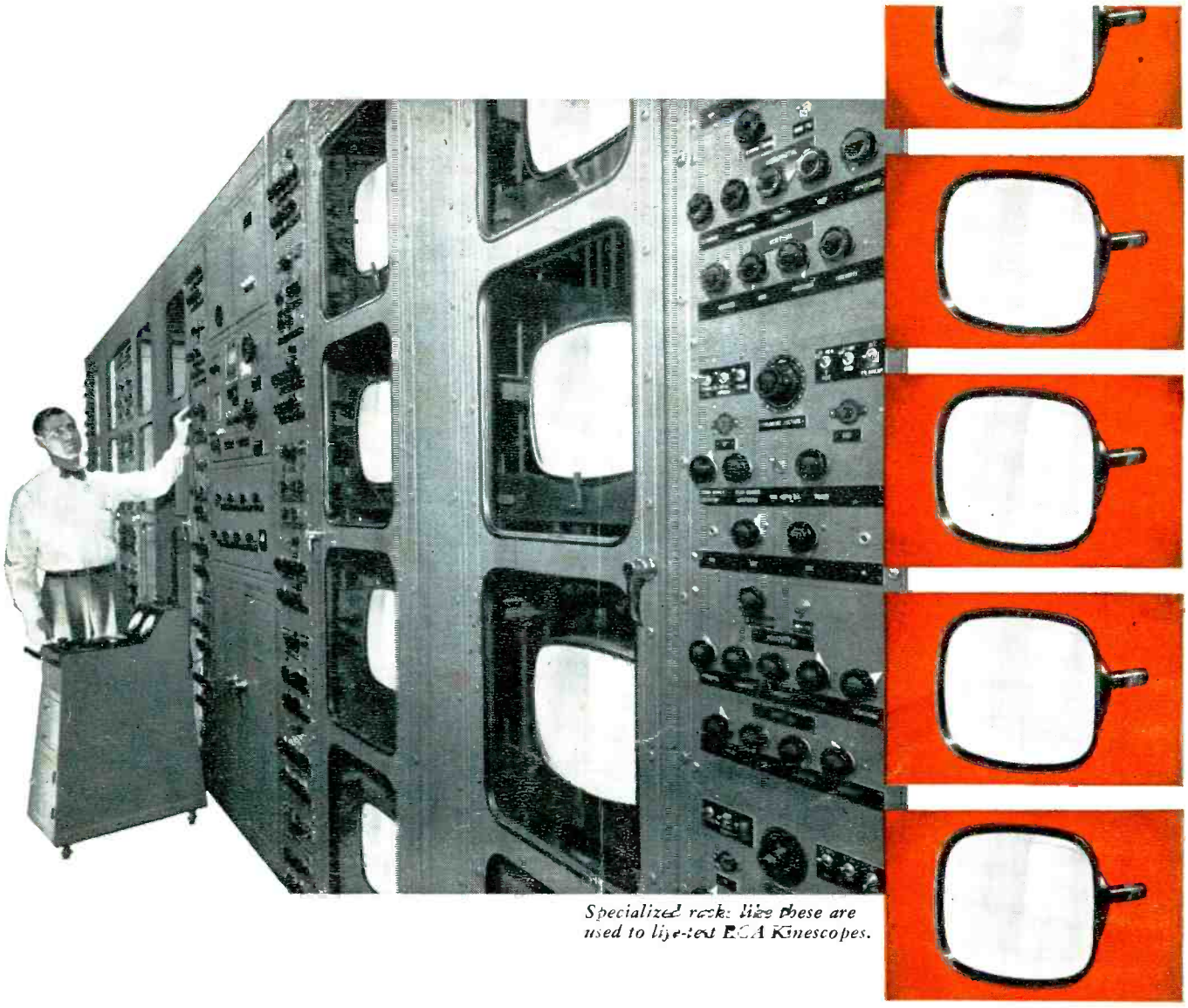

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