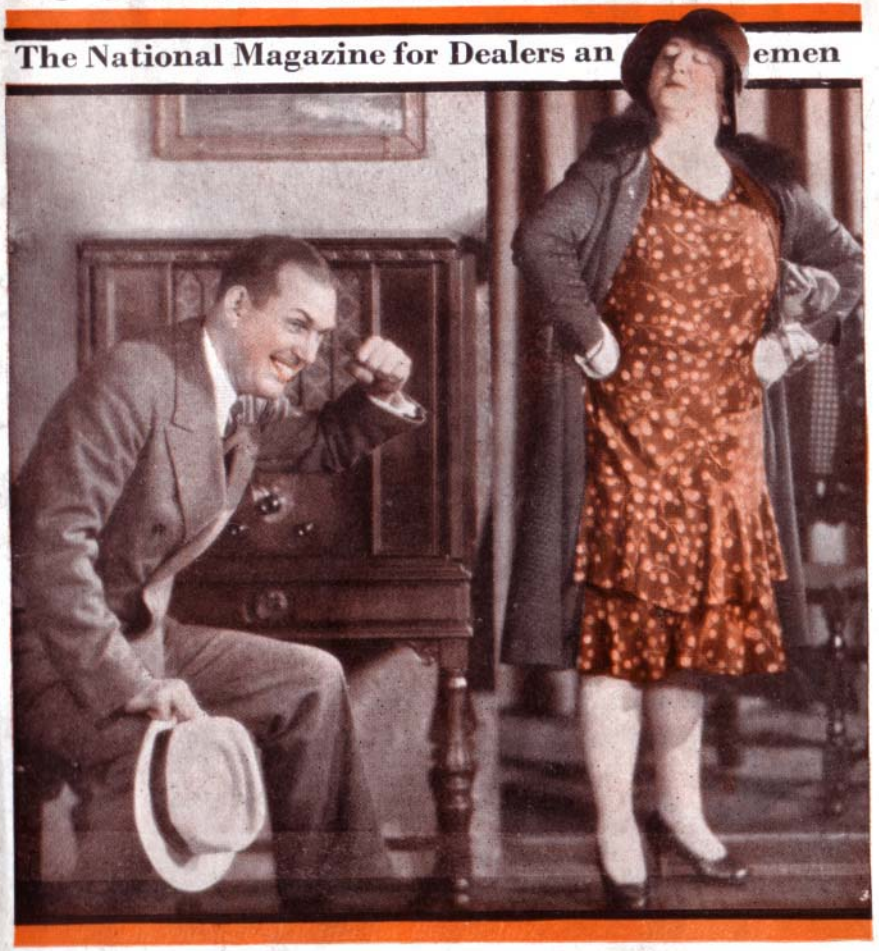
Radio Sales and Service

The National Magazine for Dealers an emen



Can you suggest a title for this picture? - - - See page 33.

October 15, 1930
Circulation 48,000
$2.00 per year

SELL MORE TUBES

By Locating The Poor Ones With This Portable

DAYRAD TYPE B TUBE CHECKER

This instrument checks all types of Radio Tubes, including Screen Grid and the new 2 Volt tubes . . . Operates from 110 Volt A. C. line. Simple, efficient, satisfactory in every way—priced right because produced in a big way.

Net Price To Dealers **$19.60**

INCREASE YOUR TUBE SALES NOW

By a canvass of your neighborhood set owners. Check their old tubes and sell them new ones.

Service Contact Means Prospect Contact

Your service department should be your greatest asset in producing set sales, through its constant touch with present set owners, who are the logical prospective set buyers.

This Portable DAYRAD HR Set Analyzer

The most compact, the most complete, the easiest to operate Set Analyzer manufactured. You do not have to be an engineer to use it—the engineering is beneath the panel. Furnished with instructions for its uses and operation in locating and correcting all Radio Set troubles.

Dealers' Net Price.... **$58.50**

Weston or Jewell meters as preferred

Get Complete Catalog of DayRad Instruments

THE RADIO PRODUCTS CO.

12 Norwood Ave. Dayton, Ohio

A *Profitable*

REPLACEMENT TUBE MARKET

Two and a half million dollars **in Kellogg Tube sales pour into the cash registers of tube dealers every year! Every customer of yours who owns and operates *any* of the following sets *must* necessarily buy this Kellogg 401 A.C. tube for replacements.**

KELLOGG sets—510, 511, 512, 514, 515, 516, 517, 518, 519, 520, 521. **McMILLAN** sets—26, 26PT. **MOHAWK** sets. **SPARTON** sets—62, 63, A-C 7. **DAY FAN** sets—5143, 5144, 5145, 5148, 5158. **MARTI** sets—TA2, TA10, DC2, DC10, CS2, CS10, 1928 Table, 1928 Console. **CLEARTONE** sets—110. And the first A.C. models of the following: **Walbert, Wurlitzer, Bell, Shamrock, Bush & Lane, Minerva, Crusader, Liberty, Metro, Pathe, Supervox,** and **Case.**

the Original

KELLOGG A. C. TUBES

are the *only* 401 tubes you can sell for replacement in these sets. The manufacturers built these receivers for, and originally equipped them with Kellogg tubes!

This market is already established for you—stock and display Kellogg tubes—it is profitable business. Write to Department 46 for name and address of nearest Kellogg tube jobber.

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

1020-1070 WEST ADAMS STREET CHICAGO

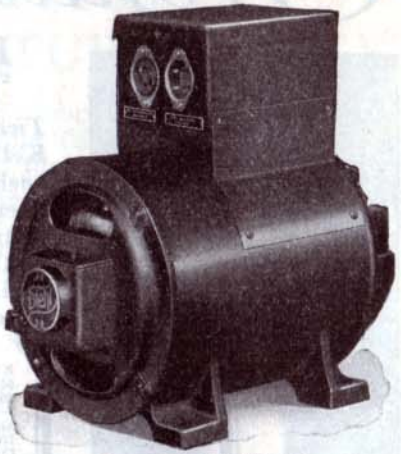
To answer an advertisement, tear out page and pin to letterhead

THE DIEHL "INDUCTOR" CURRENT SUPPLY UNIT

Supplies
Alternating Current
from
Direct Current Source
for Radio Use

Distinctive for
Quietness of Operation

NET PRICE
$47.50
Complete



Capacity—150 Watts
32, 115 or 230 volts Direct Current

AT last! A small, inexpensive yet thoroughly dependable current supply unit especially designed for use by radio dealers and service stations, for operating radio equipment on farm lighting systems and for supplying alternating current to radio sets in districts where direct current only is available.

The unit consists of a direct current motor driving an inductor type alternator. No slip rings or brushes on the alternator to produce disturbing noises! The motor is designed to eliminate all line disturbances that would interfere with radio reception. *Here is a combination for which there is a real demand, at a price that is exceedingly low!* Write for full particulars.

Motor-Generator Sets

250 Watt Sets of exceptionally rugged design are obtainable for converting 32, 115 or 230 volts D. C. to 110 volt 60 cycle, Single Phase, A. C.

Net Price $125.00

DIEHL MANUFACTURING COMPANY

Electrical Division of THE SINGER MANUFACTURING CO.
ELIZABETHPORT, NEW JERSEY
ATLANTA BOSTON CHICAGO NEW YORK PHILADELPHIA

No. 245-A Closed

NEW READRITE SET AND TUBE TESTER No. 245-A

Newly designed to meet the servicing needs of all types of radio receiving sets. Used by experts. Adaptable for every kind of socket test. Also continuity of circuits, a.c. and d.c. and all tubes, including screen-grid, pentode and rectifier. Checks line voltage. Furnished with charts, curve values and full instructions. Accurate. Compact. Simple to use. Seamless steel case finished in beautiful baked enamel.

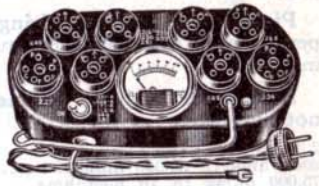
No. 245-A For Servicing Sets, $20.00.
No. 400 For Counter Tube Testing $20.00

$12 NET

Order one or more today. If not at your jobbers we will ship direct.

Readrite

NEW READRITE COUNTER TUBE TESTER No. 400



A new tester that gives dealer and customer the required tube value information. Definite grid change shift provided for mutual conductance test. Eight sockets for testing all tubes, including the new 2 volt tubes. Connects to a.c. supply. Simple to use. Accurate. Dependable.

Handsome finished baked enamel steel case. All parts completely shielded. For use wherever tubes are bought, sold or used. Complete with tube chart. Be sure to order yours today.

Catalog covering our line of many Servicing Instruments for a.c. and d.c. will be sent upon request.

Visit our Booth V-2 Chicago Radio Show.

READRITE METER WORKS

Established 1904
20 COLLEGE AVE. BLUFFTON, OHIO

To answer an advertisement, tear out page and pin to letterhead

Radio Sales and Service

The National Magazine for Dealers and Servicemen

Contents—October 15, 1930

Published Monthly at 549 W. Washington St., Chicago

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Radio Sales and Service

The National Pocket Magazine for Dealers and Servicemen

Chicago, October, 1930

Good Radio Merchandising and Good Radio Service Are Inseparable

RADIO SALES AND SERVICE is founded on the principle that purchasers of radio receivers are buying reproduction—not merely a beautiful piece of furniture that may or may not produce good music. Faithful adherence to this principle will contribute materially to the growth of the industry—radio audiences, radio advertisers, radio dealers, jobbers, and manufacturers will all be benefited by it.

Manufacturers may spend millions of dollars perfecting radio receivers, but the man who installs a receiver may defeat the purpose of their work by an incorrect aerial installation, failure to eliminate interferences, or incorrect application of tubes.

Approximately 60% of the price a user pays for a radio set goes to dealers and jobbers. It is therefore decidedly the duty of a dealer to see that the set functions when installed, to the standards for which it is designed.

Surprisingly enough dealers with a well managed service department find it not only profitable in itself, but that a liberal service policy pays them big dividends in good will, and certainly such dealers are a benefit to the entire radio industry.

What Is the Life of Radio Tubes?

The automotive service field has adopted the slogan "Change spark plugs and spark plug wires every 10,000 miles." This slogan has been developed to prevent the use of an ignition system after it has become inefficient, because it is true that spark plugs and cables will continue to function long after they cease to do their work properly.

The same thing is true of radio tubes. They often continue to light even though they may be detrimental to good reception. Intensive effort at selling receivers has caused tube replacement to be neglected. It is time the radio industry adopted a slogan such as "Check your tubes every three months — replace them at least once a year."

The result will be better radio reception, fewer trouble calls, and more tube sales for everybody.

A Manufacturer Writes on Tube Replacements

Ernest Kauer, president of the CeCo Manufacturing Company, made the statement recently that it is a lot more profitable to earn good will than to get it at the expense of someone else. He emphasized that no manufacturer can get good will at the expense of a distributor or dealer; nor can the dealer purchase good will at the expense of the manufacturer—and make it lasting.

"The main thing we ought to all keep our eye on," Mr. Kauer said, "is that we want to make a profit, and when I say we, I mean everyone—the dealer, the distributor, and the manufacturer. To justify this profit the consumer must get his money's worth.

Tell your service department about service section starting on page 40

"Tubes are guaranteed for a certain length of time and tubes made by reputable manufacturers do give satisfaction for this guaranteed period. If, as sometimes happens, the customer uses a tube five months and then brings it into his dealer, saying it is unsatisfactory and asks for a replacement, what ought the dealer do? This is the situation that happens all too frequently.

"The dealer does himself a disservice and works a hardship on the manufacturer, if he too easily accepts the return and ships it back to the manufacturer for credit. He would be a better dealer and a smarter merchant if he sold that customer a new tube. He would not only save himself the trouble the transaction causes him, and save the manufacturer the investment in the tube, but he would also net himself an additional profit.

"I venture to say that 70% of all replacement annoyances could be avoided by a stricter attitude on the part of the dealers and that their profits would be up considerably. It is proper to see that the consumer gets all that he pays for. He is entitled to that, but not a bit more. We should be fair to ourselves as well as to the public."

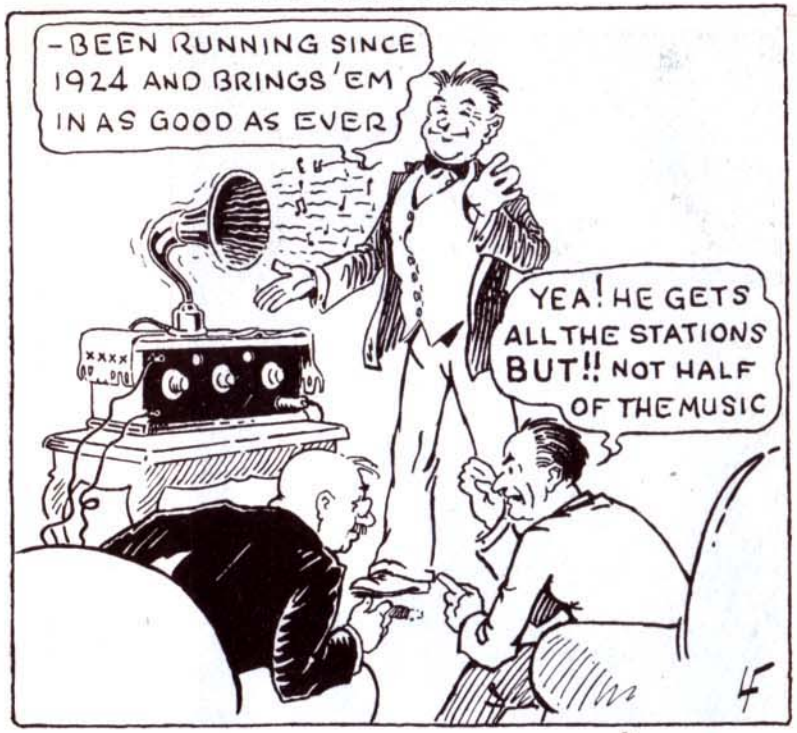
Constant Improvement Key to Radio Progress

Constant improvement is the key-note to the past and future success of the radio industry, believes H. A. Beach of the Stromberg-Carlson Telephone Manufacturing Company.

"If the next five years are to witness radio holding its enviable position and expanding appreciably, the industry must be ever watchful of the soundness of its progress. Manufacturers for the most part appreciate that this year, as never before, conservative engineering and gradual improvement with an eye to the years ahead are imperative to a healthy future state of the industry as a whole. Looking back over the progress made in the past five years, we find that with constant improvement in broadcast programs, presentation and service, radio has enjoyed a steady, sure growth. Along with the improvement in broadcasting went improvement in receiving equipment.

Even His Best Friend Won't Tell Him

(With Apologies to Listerine)



IT is peculiar that a person's ears become accustomed to the shortcomings of a radio reproducer to such an extent that he fails to appreciate a better one. In fact, a receiver that reproduces music much more realistically may be offensive—he has to become accustomed to the better reproduction to appreciate it.

Like "Halitosis," the shortcomings of his receiver are quite unsuspected by the owner, though decidedly obvious to his friends. Set owners who suspect that their receivers are not bringing in a fair share of the music should have an improved set sent in for demonstration. The period of test should last at least a week, during which time the old receiver should remain silent.

FREE TO DEALERS—An enlargement, size 11x17 inches, will be mailed to you upon request, accompanied by two two-cent stamps and a letterhead or invoice bearing your name. This enlargement displayed in your store will help you sell radio sets. Mail requests to RADIO SALES AND SERVICE, 549 W. Washington St., Chicago, Ill.

Good Demonstrations Sell Radio Receivers!

THAT'S a part of the formula which has made the Zeitler Company outstandingly successful.

"It's no use sending out direct mail literature and pulling door bells to bring in prospects, and then giving a demonstration that doesn't do the set justice," says Mr. Carl Zeitler. "What people want these days is tone quality and undistorted reproduction. When they come to our store for a demonstration we give them the best we have."

To make demonstrations as near perfection as possible the Zeitler Company has walled in a special demonstration room on their sales floor. It is draped carefully to kill echoes and fitted with attractive and comfortable furniture that invites prospects to rest while they listen. This demonstration room has proved so satisfactory that plans for another are already laid.

"And when we send a set out for home demonstration," Mr. Zeitler said, "we send an expert serviceman with it to see that it operates flawlessly. We employ only thoroughly trained and experienced servicemen, because no other kind will do justice to our sets. It isn't fair to ourselves, our sales people, or the manufacturers whose sets we handle, to jeopardize sales by careless demonstrations."

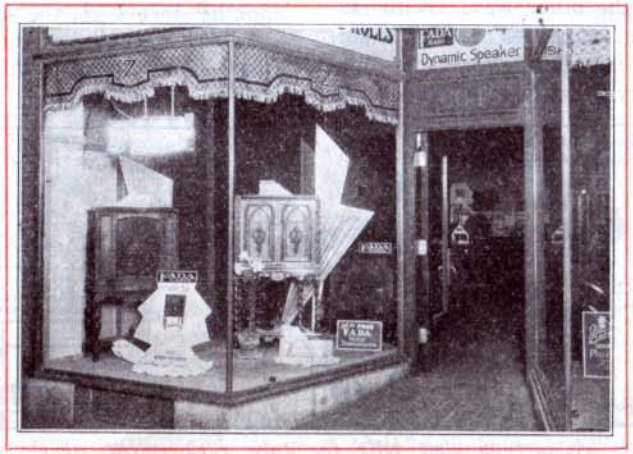
The Zeitler Company store, operated by Mr. Richard Zeitler and his son and daugher, Mr. Carl W. Zeitler and Miss Elsa Zeitler, was originally a piano store. Today it is piano and radio—largely radio. Every member of the family is a trained musician, and it is only natural that such an organization should be sensitive about faithful reproduction.

But they are just as sensitive about service, too. "We install our sets carefully, and every installation is critically inspected before it is finally turned over to the customer in perfect condition," said Mr. Zeitler. "As a result we have few service calls on new equipment," he went on to say, "but when we do we act promptly. Our three months' service guarantee means real service."

A policy such as the Zeitler Company has cannot but make friends for the store. This is evident by business that comes to the store from pleased customers. "Hardly a day passes," says Miss Zeitler, who presides over the store, makes sales, keeps the books, and answers the phone, "when we do not receive two or more calls from customers telling us about new prospects."

Service is an important element with the Zeitler organization. The basement of their store is used for laboratory service work, providing a spacious service department. "We pay our servicemen a liberal salary and commission on sets they sell," Miss Zeitler explained. "As a result they are prosperous and happy, and very much interested in the business. We don't always wait for service calls. Our

(Cont. on page 56)



A pleasing window display is always maintained.

Are Your Customers Tube Conscious?

by GRANT J. VERHULST

As in any new industry that experiences a mushroom growth, the radio industry has witnessed amazing changes and improvements during the dozen years of its popularity. Manufacturers have vied with manufacturers in flooding the market with improved and perfected sets, and until recently dealers have appealed to the American public's whim for "the newest out" and realized a big business on these improved sets by accepting the old ones in trade. Naturally, with sales emphasis entirely on sets, radio tubes have in most cases been given little attention except as a necessary accessory of the service department in cases of trouble.

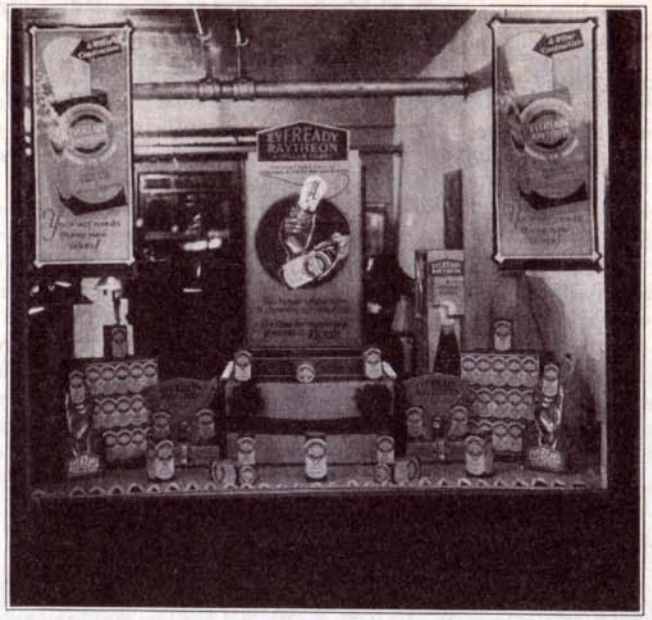
But the pendulum has begun to swing the other way. With stabilizing influences making themselves felt throughout the radio industry since the stock market crash last fall, farseeing dealers are beginning to realize that from now on the average American will not be a prospective buyer for a new radio set every other year as he may have been in the past, and so they are turning their attention to developing a "tube consciousness" among their patrons.

One has only to talk with servicemen to learn how far from "tube conscious" the radio public is today. If, as is true three times out of five in answering a service call, the repair man finds that the trouble lies in the tubes, he immediately is put on the defensive in an argument something like this:

"But I thought you folks told me that the tubes were guaranteed, that they'd give me no trouble for a long time, and here it has been only six months since I got the set."

"That may all be, but how many hours do you run your set?"

A cartoon that tells the tube replacement story. —Courtesy Lyon & Healy, Chicago.



Window Displays like this are easy to prepare using materials furnished by manufacturers.—Photograph furnished through courtesy of Eveready Ratheon.

"Oh, from the time we get up until we go to bed, and that's usually midnight."

"Well, that explains it. You shouldn't expect a tube to give satisfactory service after a thousand hours. At the rate you've used this set, you had no right to expect satisfactory reception after first three months, and yet these tubes have given you double that service."

The average radio owner may watch closely the wear on his automobile tires, realizing that to derive the greatest amount of service from his car it may be advantageous to re-tire every season. but he is slow to realize that in the same way it is to his advantage to replace the guaranteed tubes in his radio set occasionally to enjoy the best reception and reproduction.

It is a consciousness of this fact which radio dealers are today trying to turn into profits. When one considers that over 4,000,000 radio sets were sold in the United States last year and that those sets involved a sale of tubes totaling $69,000,000, it is easy to understand why merchants everywhere are launching campaigns to promote the sale of tubes.

One of the largest radio stores in the Chicago Loop, with seven branches in outlying districts and suburbs, has launched its cam-

paign through more prominent tube displays and counter literature.

"Because of our strategic position in the Loop, we have found that our most effective advertising medium is our window displays," remarked the radio advertising manager recently. "Consequently, we have prepared a series of window displays with which we hope to drive home the fact that tubes are more than mere 'radio parts.' They are the very *heart* of a set. By means of attractive posters we aim to remind radio owners that new tubes in the old set will 'improve receptivity,' 'increase volume,' '*eliminate undue noise*,' 'enrich reproduction,' 'increase selectivity,' and 'improve man's disposition by giving him the quality of tone he desires.' As for our counter literature, here is a typical example of what we are doing along that line."

He produced a radio log pamphlet in which appeared an amusing cartoon of an evening's entertainment at home that came to grief when a tube blew out. Below it was printed this legend:

Did It Ever Happen in Your Home?

A tube "goes" dead—just as you had settled down for a pleasant evening! After all, it's a needless disappointment What you would give for a "spare" tube now! . . . Best to keep a few on hand for such emergencies. Bring in your tubes for testing—gratis. Just another service that you can expect from the finest Radio Headquarters in town.

A survey of other radio shops in the Chicago area revealed that until recently many radio dealers had looked upon tubes merely as radio parts to be shelved neatly according to make and number in the service department at the rear or in the basement, because of their interest to servicemen only. The salesmen, it appeared, were too interested in displaying and selling sets. But these same dealers today are moving tubes forward out of the service department to give as much attention to their floor and counter displays as they formerly did to displays of radio sets.

Some dealers have found their service departments to be the best channel for developing "tube consciousness" among their patrons. Free tube testing service is advertised to those who will bring in their tubes. Such service not only proves an accommodation welcomed by thrifty owners, but brings people into the store, acquaints them with the merchandise on the floor, and makes of them prospects for future sales.

A few dealers have even gone so far as to follow up their sales at periodic intervals through their service departments, to determine how well the sets are functioning and to demonstrate, if advisable, the improvement in tone quality of new tubes.

"This system has many advantages in addition to selling tubes," claims William J. Berg, authorized Victor radio sales and service

(Cont. on page 60)

Dealer Sales Ideas of Proven Merit

Recording Radio Attracts Big Audience

By displaying a combination phonograph and radio equipped with a record making device in foyers of local theatres, the Tri-Par Radio Company of Chicago gained a tremendous amount of publicity. Many such groups as the one pictured watched while the amateur recording artist of the family did her favorite number.

Everyone wanted to make a record.

Contacts made while the prospects were in a very impressionable mood resulted in sufficient sales of both the recording and other models to warrant continuing the shows in other theatres.

The arrangement made with the theatre owners was advantageous to both parties. Previous to each showing thousands of handbills and posters were distributed by the radio shop. These carried advertising for both the theatre and the radio show.

Feature Interference Reduction to Increase Business

"During the dull months of the summer," writes F. A. Forster, sales manager of the Stewart-Warner Sales Company, Minneapolis, "we started an intensive drive to sell everyone of our dealers on the idea of using shielded

lead-in wire on his demonstrator, knowing that if it worked out he would naturally use it on customers' installations, and by so doing increase sales.

"The interesting result was that we not only increased our receiver sales, but it resulted in increasing our business on tubes and other accessories. We were able to get accessory business from competitive dealers, even though we were not selling them the Stewart-Warner Radio Line. The shielded lead-in wire proved an excellent order opener."

Furniture Store Takes Radio Credits on Percentage

Although it does not offer credit facilities to its customers, Huston's Store, Berkeley, Calif., has nevertheless managed to secure a certain amount of charge business.

Through an arrangement with a furniture store that does not carry radios, Huston's will sell radios to people possessing charge accounts at the furniture establishment.

Payment for this merchandise is made by the furniture dealer at the end of the week, five per cent being deducted as a return for handling the charge business and for shouldering the collection risk.

Toy Balloons Build Sales for McLaughlin and Whipple

By releasing thousands of brightly colored toy balloons bearing numbered cards—some entitling the finder to a free electric radio, others various amounts of merchandise—the Wakem & Whipple Company of Chicago, distributors of Clarion sets, broke the ice which was holding back fall radio sales in the Chicago district.

Half-page display advertisements in the Chicago papers aroused public interest before the release of the balloons. The finder of a balloon had but to call the telephone number printed on the card, giving the number of his balloon, to learn the prize to which he was entitled.

Ideal weather conditions permitted distribution to all parts of the city. Inquiries began to come in very shortly, and soon had the telephone wires jammed. In the first three days 2,500 calls were received and a total of about 4,000 calls resulted.

She found a balloon—and a radio.

A large proportion of the 4,000 calls obtained inquiries concerning the Clarion Set, and where it might be seen. These were turned over to the dealers, resulting in contacts which developed a high percentage of sales. Needless to say the dealers liked it.

A Radio Demonstration Room of Scientific Design

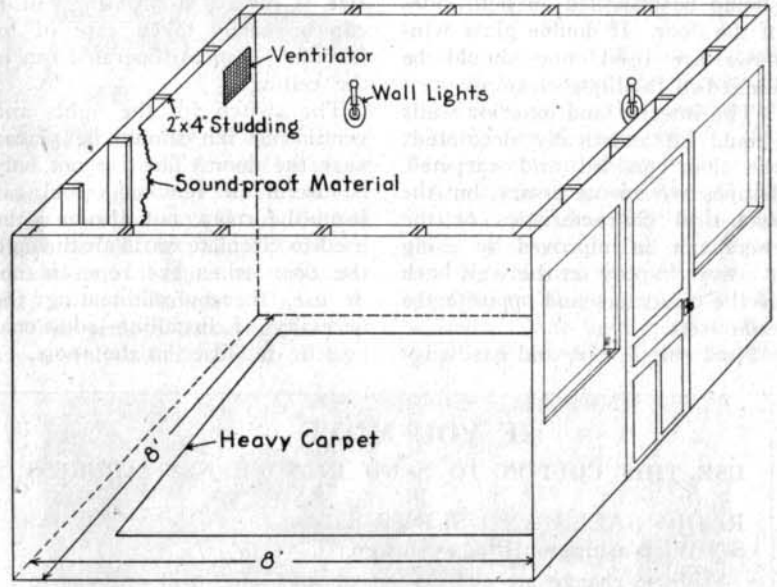
By C. W. Nash

The modern radio set, although practically free from the shrieks and howls of former sets, is capable of producing such great volume of sound that an attempt to properly demonstrate it in the main sales room of a store generally results in annoyance to other salesmen and customers in the radio department and particularly to customers interested in other lines of merchandise.

Put Customer at Ease

To reduce this annoyance and confusion to a minimum and at the same time allow the salesman to demonstrate a set with suitable volume and to permit the customer to operate the set in which he is interested without embarrassment, the demonstration should be made in a room particularly designed for that purpose.

Such a room should be adequate in size, comparatively sound proof, artistically decorated, heated, lighted and ventilated. The interior should be visible from the main sales floor and convenient to it.



Readily built by yourself or a carpenter.

A room approximately eight feet square and eight feet high provides sufficient floor space for two radio sets, seats for three cus-

tomers, a floor lamp, and room for the demonstrator to move about.

Use Sound-Proof Materials

The structure should be rigid. The studding and ceiling joists should be made of two by four timbers, with sixteen inch centers. The inside and outside walls should be made of celotex, Insulite, Masonite or similar material, one-half an inch in thickness.

The door should open outward and be provided with a glass in the upper half. Glass windows as large as construction will permit should be provided on both sides of the door. If double glass windows are used, one should be hinged to facilitate cleaning.

The interior and exterior walls should be artistically decorated; the floor padded and carpeted. Drapes are not necessary, but the acoustical characteristics of the room can be improved by using a heavy drapery on the wall back of the customers and opposite the radio sets.

No light, flimsy, and easily ignitable decorations should be used, as they contribute to the general fire hazard.

Subdued Lighting Desirable

The lighting should be subdued, but of sufficient intensity so that the details of the cabinet may be clearly seen. Two double wall brackets provided with 40 watt lamps, together with a floor lamp, will insure sufficient illumination.

A multiple wall receptacle should be provided above the baseboard and neat antenna and ground jacks installed.

Ventilation in a room of this size is always a problem, but it can be easily taken care of by installing a motor-operated fan in the ceiling.

The switch for the lights and ventilating fan should be placed near the door. The fan not only is useful in removing foul air from the room, but also may be used to circulate warm air through the door when the room is not in use, thereby eliminating the necessity of installing additional heating facilities in the room.

GOOD SERVICE BUILDS SALES for Becker's Music Shop

Every Becker Serviceman is equipped with a car and a high grade Set Analyzer.

"WE look to our service department for valuable sales as well as a profit from actual service work," says Mr. A. Becker of Becker's Music Shop, operators of a successful music store featuring radio in Evanston, Ill.

"Our service department is so successful that it handles all free service under our 90 day guarantees, shows a profit on servicing, and hands us a great number of valuable leads each year," Mr. Becker went on to say.

A successful music store at the advent of radio, Becker's was quick to use radio as a weapon to circumvent the disaster it brought to their regular music business. They have used an unusually effective service depart-

Sets too difficult to service satisfactorily in the home are brought to the shop for attention.

New Receivers

Champion Junior Receiver

The Gulbransen Company of Chicago, Illinois, has announced the Champion Junior Receiver, to be a companion set to their Champion Model, brought out earlier this season.

A gradual tone control, three tuned r. f. circuits, and volume with faithful reproduction, sufficient to meet the needs of any home, are some of the features of this set.

The console cabinet is of matched walnut veneer, 40 inches high, 24½ inches wide, and 14½ inches deep.—*October Radio Sales and Service.*

Fada D. C. Receivers

The F. A. D. Andrea, Inc., of Long Island City, have developed a series of receivers for use where 110 volt d. c. is supplied. They fully equal alternating current models in all features of performance it is claimed.

Undistorted speaker output equal to A. C. sets is secured by using six 71 type power tubes in two banks of three each, operated in push pull.

Three screen-grid tubes in the radio frequency circuits give very good sensitivity.—*October Radio Sales and Service.*

A Midget with Built-In Antenna

The midget receiver, Model H, of the Simplex Radio Company,

Sandusky, Ohio, has built-in antenna. This feature, together with its weight of but 25 pounds, and size of 13 inches wide, 18 inches high, and 7 inches deep, make it truly portable.—*October Radio Sales and Service.*

General Electric Radio

The General Electric Company, of Bridgeport, Connecticut, is producing a superheterodyne radio receiver in several styles. The

chassis—embodying nine tubes, four of which are screen-grid, a tone emphasizer, and local-long

(Cont. on page 54)

New Accessories

Coin Control for Radios

The Slusser Coin attachment, which may quickly be applied to any A. C. radio allowing its operation only when a nickel has been deposited, is manufactured by Frank E. Pierman of Ottawa,

Ohio. One coin permits operation for six minutes, or six coins may be deposited giving continuous operation for thirty-six minutes.

No change in the set wiring is necessary. The cord is plugged into the device and locked, while a cord from it connects to the light socket.—*October Radio Sales and Service.*

Radio Tone Control

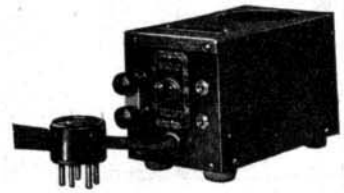
The Bud Radio, Inc., 2744 Cedar Avenue, Cleveland, Ohio, announce a new tone control which they claim can be attached to any radio set in two minutes' time.

This device makes it possible to accentuate the high or low notes at will.

To connect the Bud Tone Control, as it is called, to a radio set it is only necessary to place the connected adapters to the bakelite box, under the power tubes in the receiver. A single dial then varies the tone.—*October Radio Sales and Service.*

Electric Pick-up Booster

The Pacent Electric Co., 91 Seventh Ave., New York, N. Y., announces a single stage audio amplifier for stepping up the output of an electric phonograph pick-up.



By connecting this unit between the pick-up and the set the volume will be greatly increased and the enjoyment of electric reproduction may be had with any good set.

To install this unit it is only necessary to remove the detector tube and insert the adapter between it and the socket. A switch on the panel of the booster allows instant change from phonograph or radio operation.—*October Radio Sales and Service.*

Burton-Rodgers Test Oscillator

The Burton-Rodgers Company of Boston, Massachusetts, have developed a test oscillator that combines a variable range from 1500 to 550 kc with fixed ranges of 175 and 180 kc.

This instrument is very useful in aligning the intermediate frequency stages of superheterodyne receivers. It operates on 110 A.C. or external batteries for filament supply and one small B battery for plate supply.

The whole unit is completely shielded and is mounted in a durable carrying case.—*October Radio Sales and Service.*

(Cont. on page 57)

Worn-Out Tubes Often Rob Radio Of Interest

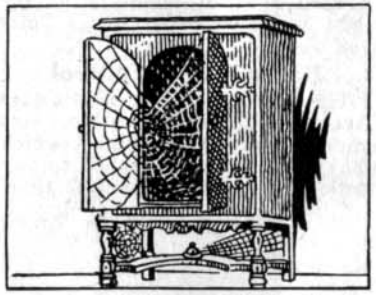
By Walter Jones*

To the eye of the average set owner a radio tube and an incandescent lamp are much the

same—"all right as long as they light." He does not know, because he has never been told, that after the radio tube has been in active service for a thousand hours or more it begins to lose its efficiency, and that after two thousand hours of actual use it cannot be expected to give good reception.

Programs Line Listener

It will still pick up a program, but Mr. Radio-owner and his family will not be getting the pleasure that they enjoyed when the set was new. They no longer sit up until long after midnight, afraid of missing something good. There doesn't seem to be anything as good as that any more. They are "getting tired of the radio." Sometimes it stands idle for days at a time. There's nothing wrong with it, of course. Distant stations still come in, and the old favorites are still on the programs, but the family just doesn't care for it any more. Mother has lost interest in the recipes she used to copy so faithfully. She says listening so close makes her tired. And Dad is sure Amos and Andy aren't nearly as good as they used to be. He can't understand half of what they say. It can't be the set, of course. It's only a little over a year old, and it cost a lot of money. And it can't be the tubes; they still light.



And there's another radio on the way to being a good place to set the new lamp.

There are authentic records of radio tubes that have been in use for two years, three years, or more, that are still giving satisfactory service. This is a record to be proud of, but not one to strive for. A radio tube is a precision instrument, carefully made, delicately adjusted. In a labora-

(Cont. on page 28)

Sales and Service Engineer, Sylvania Products Co.

(Cont. from page 26)

tory it would receive the care accorded any fine equipment. In a radio receiver it gets little or no consideration from the average owner, and it is expected to work as hard and as well in its extreme old age as it did in the heyday of its youth. There are no old-age pensions for radio tubes.

Manufacturers Make Many Life Tests

Exact and extensive tests are constantly being made by the service laboratory of tube manufacturers to determine the effi-

cient life of a radio tube. These include life tests in which the tubes are allowed to burn continuously until they flicker out, and performance tests in which the tubes are used in various types of radio receivers. As a result of this combination of tests it has been definitely established that two thousand hours of use is the extreme limit of efficient operation for a radio tube.

On the basis of eight hours of use per day, which is not unusual, this would allow eight and one-half months of service to each tube. A complete change of tubes every six months, however, will add volumes to the owner's satisfaction and pleasure.

Replace Tubes Twice a Year

Since, when the set was purchased it was equipped with a complete set of new tubes, it might reasonably be expected that all of these tubes would be retired at the same time. The uninstructed radio owner does not reason that way. If a hasty glance or a superficial test show him that two or three of the original set of tubes are completely dead, these are replaced. The rest, as long as they will light, are kept at work. As a consequence, there will always be several tubes whose efficiency is far below par, making satisfactory radio reception impossible.

Test Tubes Free as an Inducement

There is in this situation an opportunity for some effective missionary work on the part of dealers and servicemen. A comparative test will often accomplish what no amount of talking will do in the way of convincing the set-owner that the tube that will light is not always a good tube. Dealers are finding this an effective method of increasing tube replacement sales and keeping radio owners satisfied. An offer to test the tubes free of charge is the inducement that brings the set-owner to the dealer with his set of 1500 or 2000 hour tubes. He is given a chance to listen to the performance of a radio set like his own with a full set of new tubes, then to the change in the quality of reception as his own overworked tubes are substituted for the new tubes.

Schools Afford Good Market for Radio

By Grant J. Verhulst

Schools today are one of the most fertile sales field of the radio market. In view of resolutions adopted recently by various groups of educators in convention, and in view of experiments just completed or still under way to determine how effectively radios can be used in the educational system of America, the executives of our schools have already sold

A principal may address the whole school from his office

themselves on the advantages of school radios.

"There are many programs being broadcast from the various stations in the state which are of great educational value, and I believe that our schools should be equipped with radio sets so that advantage may be taken of these programs," declared Raymond S. Jewett, president of the Association of New York School Boards, in his annual report to the association. "The larger schools should have a loud-speaker in each class room, which should be under the control of the principal, so that a program suitable to a particular class or group of classes could be heard by those classes while they remained in their rooms and without interference with other classes."

Such an installation was tried out in the Mount Vernon schools of New York and found to be very satisfactory. It is now a regular feature of the schools of that city.

Similar interest in radios as an educational medium was expressed by superintendents and principals from all over the United States at the sixtieth anniversary meeting of the Department of Superintendence of the National Education Association, held at Atlantic City.

"We recognize in the radio", reads a resolution adopted at the convention, "a new and powerful instrument of far-reaching importance. We view with deep interest the experiments now being made to develop programs which shall enrich and supplement the work of the schools in many directions. . . . We accordingly

recommend that the executive committee be authorized and directed to appoint a radio commission who shall be empowered to present to radio corporations the points of view which shall prevail in the development of educational programs."

Even the large broadcasting corporations with their vast networks of stations over the United States have sensed the increasing interest in programs especially adapted to school children and have taken steps to supply them. The National Broadcasting Company, Inc., may be considered the pioneer in this respect.

Two years ago it attempted a series of symphony orchestra concerts specially suited to youth and directed by the famous orchestra leader, Walter Damrosch. Because of the hearty response to that experiment, last season the company's entire net works, covering more than 60 stations, were hooked up, making it possible for the concerts to be heard in nearly every community east of the Rockies.

To assist schools having radio receiving sets to use them to best advantage, the Journal of the National Education Association, published monthly, has since last January been running a radio log of suitable school programs, giving the station, the wave length, the date, the time, and the nature of each broadcast.

How Dealers Are Getting School Business

At Marysville, Ohio, the Electric Shop last year offered to donate a screen grid radio and ten speakers to the high school, provided its students entered a contest as radio salesmen. The senior class assumed the responsibility of canvassing the town. Members of the class were fitted out with attractive badges enscribed with the words, "We Are

(Cont. on page 60)

A lesson taught by radio holds the attention of all.

Sales Stimulants

Radio Sales and Service will pay $2.00 for each sales idea published. Send in story of successful schemes you have used.

An Unusual Welcome

To a picked mailing list, a radio store in White Plains, N. Y., once sent a key. It was a regular store key—nothing odd about it—but attached to it there was a tag which read:

"Here is the key to our Store. Come in and make yourself at home. Our stock now includes

the models of the new year and we would be pleased if you were to give them an audition."

Cooperative Window Display

There are two retailers in Detroit, Michigan, who are firmly convinced that inter-cooperation pays. One is a clothing store and the other, a radio store. For a long time each of these concerns has devoted one of its windows to the display of merchandise kept by the other. A small announcement indicates where the goods can be secured. As the stores are located in different parts of the city, this exchange of displays gives their window advertising wider latitude.

Shoots at Crowds

Whenever Demoville's, Nashville, Tenn., draws a crowd of more than usual proportions, a

flashlight photograph of it is at once taken.

Customers Won't Get Lost

Newcomers to Birmingham, Ala., several days after their arrival, are the recipients of a guide

book to the city. This is sent to them by the Louis Saks store.

Short Wave Reception

Something New to Sell to Your Old Customers

For alert radio dealers short wave reception provides the key to a big, new, and profitable market.

The novelty and interest in broadcasting from Europe, Australia, Africa, and South America is an impelling sales power that modern world-minded people find it difficult to resist.

Nor is the value of short wave reception confined to foreign programs alone. Many stations in this country broadcast on short wave, as well as normal wave lengths. It is easy to pull in coast to coast reception in a practical way on short wave.

From this it must not be inferred that overseas stations can be brought in with the same ease and volume as local stations. Fading is ever present, and atmospheric conditions, of course, interfere a great deal more with long distance reception. Then, too, it is much more difficult to keep contact with foreign programs than is the case with local ones. Nevertheless, the results obtained are amply satisfactory to provide a tremendous amount of interest and entertainment. The ease with which a set can be switched from operation on regular broadcast waves to short waves makes it entirely practical to listen to a local station one moment and Europe the next.

The average citizen, however, has no idea that it is practical for him to get foreign programs on his present receiver with an invest of but a few dollars in additional equipment. He thinks short wave is only for professionals, experimenters, and amateurs. This, of course, is not true. Short wave adapters and converters are available which make it easy to get short wave reception with ordinary receivers. Devices of this type have been on the market for years; thousands of them are in practical use. They are thoroughly proven, simple to operate, and easy to install. In fact, coupling up two or three wires and moving the aerial are the only installation efforts required.

Walker Super Converter made by Workrite Manufacturing Corporation, 1811 E. 30th St., Cleveland, Ohio.

Imagine going into the home of one of your prospects with a converter or adapter, hooking it up to his receiver in less than a minute, and then tuning in Europe, or for that matter, even New York or Los Angeles, by short wave.

Imagine a demonstration in your own store, whereby you bring in over-seas programs, having previously called in a number of your best customers.

Short wave reception bids fair to have all the interest—perhaps even more interest—than radio did when it first started. Musical programs from Holland, Germany, and England are now possible for every home.

Submariner, made by J. M. P. Manufacturing Company, Milwaukee.

From the dealer's standpoint, the possibility of short wave devices is of outstanding merit. It is a sales stimulant of the highest order awakening, as it does, new interest in radio.

Today the only possible revenue from customers with modern receivers is the sale of new tubes or a little service work. But the advent of short wave adapters and converters makes each old customer a new prospect.

It is a simple matter to become conversant with the possibilities in this new field. You only have to order one of the proven units on the market today and demonstrate it in your store or home to your own satisfaction. You will get a thrill out of the foreign programs yourself which will quickly open your eyes to the big market awaiting you.

Following is a list of some of the manufacturers of equipment for bringing in short wave programs with ordinary broadcast receivers:

(Cont. on page 60)

$25

Is Now Offered for

The Best Title

and $1 each for ten other interesting titles for the cover of this issue of RADIO SALES AND SERVICE

1. *Contest closes December 1.*
2. *Contestant must be connected with a radio dealer or service organization.*
3. *Print plainly your name, address, firm with which connected and position occupied.*
4. *More than one title may be submitted.*
5. *In case of a tie each winning contestant will receive $15.*
6. *Ten exceptionally interesting titles, following the winner, will be awarded $1 each.*
7. *The winner for October will be announced in RADIO SALES AND SERVICE for December.*

STATIC

Ever Have the Blues?

Five sax'es playing "Bye-Bye Blues" on a Monday night program sponsored by a blue-green gasoline.

* * *

An instrument has been developed that will measure one billionth of an inch. It will be used by motorists in finding parking space.

* * *

Heard on a Sunday Morning program: "Mrs. Finch has just sung 'The Lord Knows Why'."

* * *

Now they have midget automobiles with which the radio merchant may deliver midget receivers.

* * *

How I'll Miss the Drum Major

The U. S. Army has developed a super phonograph mounted on a truck, to take the place of the regimental band.

* * *

Television Is No Gentleman

Engineers say television transmitters have a distinct aversion to blondes. It is the brunette that televises clearly.

* * *

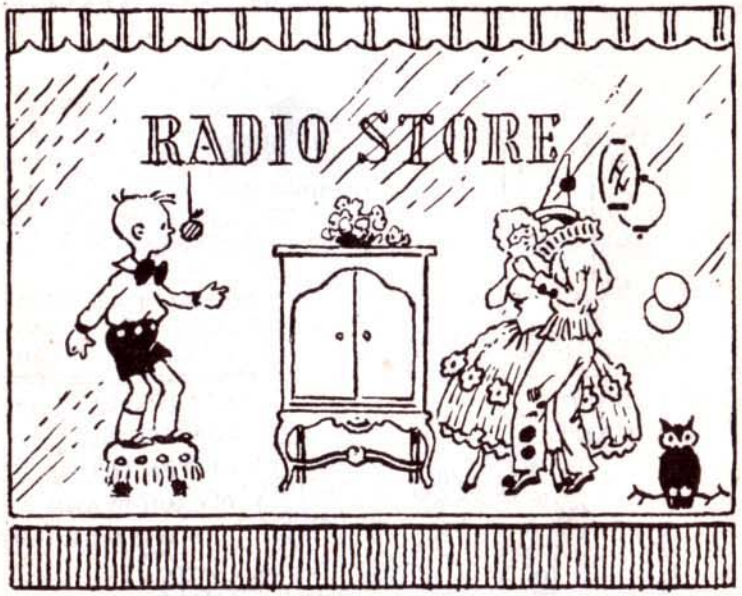
Said the radio salesman as he was proposing: "Remember, this is the last day of this remarkable offer."

* * *

They have an electric eye which automatically opens a door in a restaurant when a waitress approaches with a trayload. Wonder why they don't put that on some of the apartment doors I try to carry consoles through?

RADIO AN' HOW!!!

Hallowe'en Displays



The grand climax of the autumn season is, of course, Hallowe'en with its galaxy of parties and dances.

Unfortunately, too much attention is paid to the outdoors environment, with spooky field and woodland scenes; few of which are appropriate from a sales standpoint to radio, which is to provide dance music for the party or dance.

Such trims are arranged by the hundreds; yet we wonder why retailers continue to waste their sales ammunition. Of the innumerable such woodsy displays last season, only one of them had a logical business reason for its existence.

The Francis Piano Company, Galesburg, Illinois, to celebrate Knox County Centennial, devoted their brace of show windows to pictorial contrasts of the crude 1828 log cabin interior with the artistic 1928 living room. The inside walls of this log cabin were painted setpieces (at a cost of $75) by a local artist, with the floor space filled in with such antiques as an old spinning wheel, musket rifle, hooked rugs, samplers, candlesticks, and home-made furniture. There was an organ in the room.

A step away and the public was treated to the scene of a modern living room interior, complete to a radio and a grand piano. Mr. E. A. Francis felt the display twosome was entitled to newspaper recognition, so the copy, in refering to the display contrast, pointed out that,

"It is well worth while to stop a moment and see this exhibit and consider the progress made in our mode of living in the past century."

To Suggest Radio

The Hallowe'en Spirit at Its Best

Apart from such an exception as the foregoing, the dominant Hallowe'en radio setting is the modern living room interior, such as was sponsored last season by display manager A. Matzer of the F. and R. Lazarus Company, Columbus, Ohio. The setting was especially appealing because it was a slice of life, alive with human interest. The life-like figures of young people (clad in masquerade costumes) were entering the room, to consume the liberal spread provided for them. These figures were grouped in the most casual, yet natural, manner. Two were entering the orange curtained doorway at the rear; two were inspecting the attractive table lay-out; and two others were engaged in conversation.

Tell your service department about service section starting on page 40

Garlands of autumn leaves forked out from the central chandelier, covered with a black and orange canopy. At each side of the curtained archway was a stone pottery urn, holding long sprays of autumn foliage.

The table placed crosswise at the middle of the large room was spread with an orange crepe paper cloth, with a black crepe runner in the middle. The table was set for six, with two chairs partly drawn up.

Hinting of a musical programme was the modern radio model, standing to one side of the archway.

Interior Layout

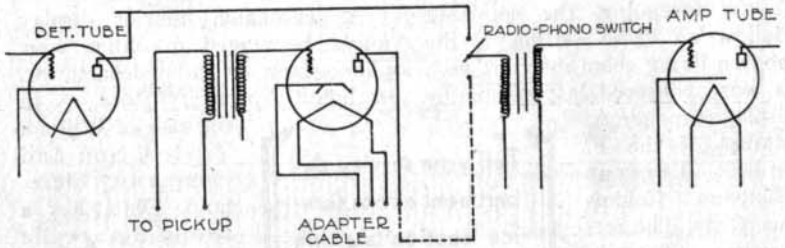
A seasonable interior display might be staged in either your phonograph or radio department, or both. Not every store, as in the case of William Taylor, Son and Company, Cleveland, Ohio, has a shopping arcade connecting with two streets, so the interior display alternative is suggested. One October feature along the Taylor arcade was staged on a long platform at one end of which was the latest console phonograph model, priced at $175, and behind which was a mass of cornstalks.

On a pedestal beside the cornstalks was a fiendishly-grinning Jack o'Lantern, lighted. The space between this exhibit and the one at the other end was purposely provided so that the instrument could be demonstrated.

The opposite end of the platform was banked with two large bundles of corn shocks, in between which was a show card listing three timely record numbers.

One Stage Audio Sets Need Boost for Best Pick-up Results

With the widespread use of a power detector and one stage of audio frequency amplification in sets this fall, the electric phonograph pick-up can no longer be connected to the receiver without thought, if one seeks the fine quality and volume which a good pick-up and an efficient receiver invariably delivers when properly employed to play records. In sets of former years the two stages of audio frequency amplification used were fully adequate to amplify music picked up from the record, and it so happened that the magnifying power of the audio portion of the receiver was in practically all cases of the proper design to do the work very effectively.



The unit goes between the detector and audio tubes.

Not infrequently the buyer of an electric phonograph pick-up is at first disappointed with results. The disappointment can be charged almost without exception to not knowing the limitations of a particular receiver in regard to the reproduction of phonograph records. Sometimes volume from a single audio stage will be barely audible.

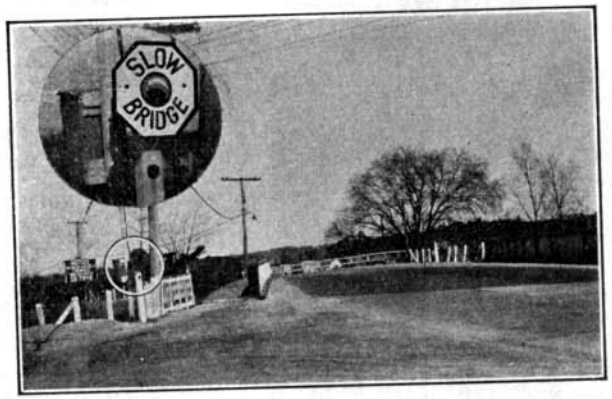
It must be remembered that the output from a pick-up is only a fraction of that delivered by an efficient power detector. Consequently with much less input delivered to the audio amplifier in single stage, volume and quality of reproduction from the speaker are bound to be lacking.

The solution to the problem of satisfactory volume from one stage audio sets obviously rests in supplying additional amplification, or a "boost," to the output of the pick-up.

After experimenting with many schemes and circuits to devise a means of supplying the desired amplification to any type set, engineers evolved compact "booster" units which are universal in their applications. It was found possible to use the "booster" stage advantageously with all types of one stage audio receivers,

(Cont. on page 56)

Greater Radio Sales Through Interference Reduction



By W. C. WILBUR*

So many dealers have reported an increase in their volume of sales, due to better demonstrations obtained through a scientific study of interferences, that we believe the interference problem worthy of very serious study.

Interference in a radio set can usually be attributed to one of three sources: it is either picked up by the set itself, by the aerial, or it is conducted into the receiver through the power line.

The phenomena which cause disturbances in radio reception are usually caused by an interruption of current flow along a conductor, or a discharge of potential from one conductor to another, or to the ground. For an example of the effect of a loose connection causing an interruption of current flow, notice the clicking sound in the reproducer when either the antenna or ground connection is allowed to make intermittent contact with the terminal of the receiver. This making and breaking of contact, of course, interrupts the flow of radio frequency current to the receiver.

It is not necessary, however, that the loose contact be directly in the receiver circuit. This can be demonstrated by observing the click in the radio set when a light switch or dial telephone are operated.

From these simple illustrations it will be seen that any electrical appliance containing contacts which are constantly making and breaking, such as commutators, thermostats, or centrifugal speed governors, are broadcasters of radio interference.

An example of interference caused by the discharge of potential accumulated on a conductor will be found by the noises in a receiver when a metal lamp stand is tapped with a metal pencil or a piece of wire, or when the frame of an electrical appliance is touched to a ground wire.

The intensity of interference due to various conditions is not regularly in proportion to the current or voltage of the circuit in which interference is created. It will be found frequently that more interference arises from the interruption of a small current of low voltage than from a greater current of higher voltage. For example, one of the most intense interference broadcasters is a dental engine which draws a current of approximately three amperes at 110 volts, whereas a large rotary converter handling as much as 1000 amperes at 600 volts usually creates little disturbance.

It is also true that the amount or intensity of sparking evident in the operation of an appliance is not necessarily an indication of the interference likely to be caused by this appliance. It will frequently be found that intense interference will result from the operation of appliances giving no apparent evidence of sparking.

Regardless of physical indications, the amount of interference due to any of the causes under discussion will be governed by the electrical constants of the circuit in which the effect takes place. Since these constants are seldom the same, there is no simple rule for determining the interference producing characteristics of any circuit. The most satisfactory method of checking an electrical circuit is a specially designed instrument which registers interference intensity and indicates the exact places in the circuit at which interference is produced. (Descriptions of how to build an interference locator will be published in the November issue of RADIO SALES AND SERVICE.)

Many interferences originate at points quite remote from the radio receiver.

The interference is distributed in three ways: first, by direct radiation from the point at which it originates; second, by conduction along wiring systems; and third, by coupling to wiring circuits or metal objects within the electrostatic or electro-magnetic field surrounding any conductor on which interference is being carried.

Consequently interference originating perhaps miles away from the receiver may be carried along power lines or induced in telephone or signal circuit, and thus carried toward the receiver. If the antenna or lead-in is within the electro-static field surrounding any of these wires, interference will naturaly be induced into the receiver.

When troublesome noises are encountered in an installation the set owner naturally attributes it to the receiver. Under such conditions the dealer or serviceman should immediately investigate all sources of interference in the home.

(Cont. on page 62)

*Sales Engineer, Tobe Deutschmann Corporation, Canton, Mass.

An Encyclopedia of Radio Set Analyzers

The Dayrad Radio Set Analyzer

The Dayrad A.C.-D.C. Radio Set Anaylzer is a two meter model, having all tests controlled by a single rotary switch. By means of six ranges on the D.C. meter and four on the A.C. meter all tube circuits may be tested, as

well as the input and transformer voltages.

Continuity tests may be made with one of the meter scales and a small flashlight cell contained in the analyzer.

Mounted in a molded bakelite case, and with an adapter plug and cord, the net price is $58.50. —*October Radio Sales and Service.*

Readrite No. 9 Kit and Set Analyzer

The Readrite No. 9 Test Kit

and Set Analyzer is constructed along lines entirely different from the usual. There are nine separate meters, each fitted with a pair of pin plugs. The panel has likewise as many different sets of pin jacks, allowing the meters to be shifted about to suit the test. There is also a completely wired tube tester included in the test kit.

The panel, meters and all accessories are housed in a neat carrying case. The dealers' net price is $35.00. — *October Radio Sales and Service.*

Jewell Pattern 199

Jewell Pattern 199 set analyzer employs one A.C. and one D.C. meter. They are calibrated in sufficient scales with series resistances and parallel shunts to allow all tube voltages and currents to be read.

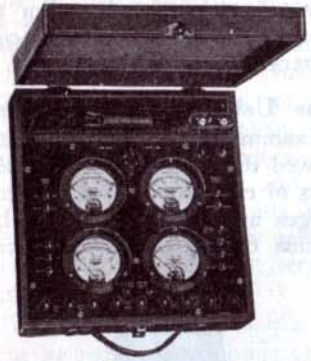
Blanks are furnished on which these readings may be recorded. Upon completion of the card, it is compared with a chart found in the manual accompanying the analyzer, and any discrepancies noted.

The price is $78.12, when furnished in a portable cabinet of laminated ply-wood covered with leather-grain material.

It may also be had in a larger carrying case having space for tools and spare tubes. The price then is $110.00.

Jewell Pattern 409

The Jewell Pattern 409 Set Analyzer permits the simultaneous reading of plate, grid and filament



voltages and plate current. Two D.C. voltmeters, an A.C. voltmeter and a D.C. milliammeter are used. Thirteen ranges are provided, any of which may be used alone through the sets of binding posts found along the front of the analyzer panel.

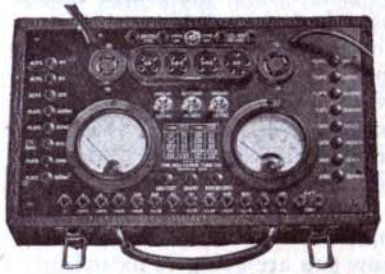
Push button switches select the correct instrument ranges in testing.

This analyzer comes in two styles, with a compact carrying case, for $91.88, dealers net, and also with a larger case, having room for tubes, tools and so forth. This is priced at $103.13, dealers net.

The Van Horne Set Analyzer

The Van Horne Set Analyzer makes a complete analysis of all circuit conditions existing in any radio receiver or electrical apparatus within the limits of 800 volts, A. C. or D. C.

Two meters, with eleven ranges are included; any of these scales



may be used externally through pin jacks mounted on the panel.

Push button switches are used to select the tube circuit it is desired to test.

Provision is made for checking tubes independently of the set.

This instrument, mounted in genuine leather carrying case, is priced at $82.00 net to the dealer.

The Readrite Model 245 Tester

The Readrite Set and Tube Tester is particularly designed to test sets using both screen-grid type and 245 power type tubes. An adapter plugs into the set socket and allows measurement of A, B, C, S-G, and Cathode volts, normal plate current, and grid test change.

A unique feature of this tester is the metal cover which holds all cables, cords, plugs, and adapters. List price $20.00.

Weston Model 547

The Weston Model 547 Set Tester is equipped with a six range D.C. voltmeter, a two range D.C. milliammeter, and a five range A.C. voltmeter.

It is possible to read simultaneously the A.C. heater voltage, plate current and plate grid bias or cathode voltage.

(Cont. on page 61)

Jim Burrows Solves Condenser Replacements

"Jim, this is the fourth time I have had this eliminator in your shop in three months. It's cost me $13.50 and still it doesn't work. What's it going to cost me to have you really put this thing in first class condition? You have so many little things hanging around the side that there isn't room for any more, and I can't see how you are going to fix it."

Although his friend Ed made the above statement in a perfectly friendly tone of voice to Jim Barrows, a successful serviceman in a city of 100,000, Jim was embarrassed because the job certainly was not a credit to him. His only alibi was to blame the man who did the work.

After Ed had gone I suggested to Jim that we go through the eliminator and find why so much time and money had been spent without getting results. Jim replied, "Oh, those damned condensers are no good."

Was Using Makeshift Parts

Examination of the eliminator showed that three out of six sections of condensers used had cartridges added to the circuit, but outside of the case. These cartridges looked old, were mis-shaped, and had been subjected to heat.

"This is the fourth time I've had it in."

It developed that these replacement cartridges had been taken from a defective block of another eliminator, but that on his test they proved to be of the correct capacity.

In this eliminator, as is frequently the case, the various taps of the condensers were units of varying voltages. For example, the first unit after the tube was 600 volts, the next two 400 volts, and the by-pass units 200 volts.

The serviceman, in tearing down an old condenser block, had evidently obtained a condenser in which the 600 volt unit and one or more of the 400 volt units were bad. He had used the low voltage condensers on the high service section.

When I pointed out to him his error he requested information as to how he could tell the correct units to use for replacement when he had only the capacity required. I explained that as a general rule to use condensers from a partially blown block is a very unsatisfactory practice. It takes a lot of time to dig them out of the wax, and in case the block has been on for some time after the first unit has blown, heat generated through the partial short is liable to cause the condenser windings to become mis-shaped and charred.

Condensers Deteriorate Constantly

Furthermore, I explained to Jim, a condenser block that has been in service for some time has lost a portion of its life. Alternating current passing through a condenser, as it always does, carries some materials from one place to the other through the insulation and eventually the condenser must break down, although some condensers may last for years.

I gave Jim the following table for use in determining voltage ratings of condensers, manufacturers' ratings being fairly uniform:

Two papers of ½ mill..	200 volts
Three " " " " ..	400 volts
Four " " " " ..	600 volts
Five " " " " ..	1000 volts

Using this table if you are to repair an old condenser block, through micrometer measurements you can determine the thickness of papers between foils and thus intelligently select condensers of the correct voltage ratings. Incidentally, there are intermediate sizes where thicker or thinner papers than ½ mil. are used, but ½ mil, is used in the greater proportion of condensers.

After our discussion Jim checked up and learned that he had several customers who had spent more than $10.00 each on eliminators. He arrived at the conclusion that their trouble had been due to his having used replacement cartridges taken from blown blocks. He decided to investigate the cost of new blocks for his service work and was quite surprised to learn that he could buy a brand new large block, one that he could guarantee, for but $4.08.

(Cont. on page 63)

SERVICE QUESTIONS

Contest for Servicemen

To stimulate study on service principles and problems, RADIO SALES AND SERVICE offers a prize to the serviceman who sends in what our technical staff considers to be the best answers to the six questions shown on the following page. The successful answers will be published next month with the name of the prize winner. Mention will be given to the servicemen supplying answers that merit second and third places.

In answering these questions attention should be given to thorough analysis of each problem involved. Answers should be written legibly with ink or on a typewriter, with no one answer over fifty words in length.

The best type of service demands a thorough understanding of the underlying principles of radio, combined with knowledge as to the correct methods of application. The former is acquired through diligent reading and study; the latter through experience and practical experimentation.

By studying the questions listed in this section and digging out the answers from various sources, servicemen will not only acquire knowledge of tremendous value to them, but they will develop methods of analyzing service problems that will increase their proficiency.

The October Prize Is a Jewell
Pattern 574 Volt-Ohmmeter. This instrument includes ranges of 0-30-300-600 volts and 0-10,000-100,000 ohms. These ranges are sufficient for all testing of potential and resistance in radio and public address equipment.

The various ranges are secured by depressing push-button type switches and changing the pinjacks into which the test leads are plugged.

Questions for October Contest

1. What is the normal filament voltage and current of a 227 type tube?

2. Give a simple test for telling whether an open-circuit is in the audio or radio frequency stages of a radio receiver.

3. How would you eliminate interference picked up by the antenna lead-in?

4. Describe a good method for neutralizing and aligning gang condensers.

5. How would you correct interference due to an electrical icing machine?

6. If you found an unmarked four-prong socket in an A.C. set, how would you determine the correct type of tube to use, by means of a voltmeter and without tracing out the circuit?

Rules of the Contest:

1. Every man employed in full-time radio work is eligible, but winning one prize disqualifies the serviceman for future contests.
2. To enter the contest simply write answers to questions listed on the following page legibly with ink or on a typewriter, and mail them to RADIO SALES AND SERVICE, 549 W. Washington St., Chicago.
3. Answers must be accompanied by a letter-head or invoice bearing the name of the retail organization with which serviceman is employed.
4. Contest closes October 31, 1930.
5. Honorable mention will be given to the contestants meriting second and third places.

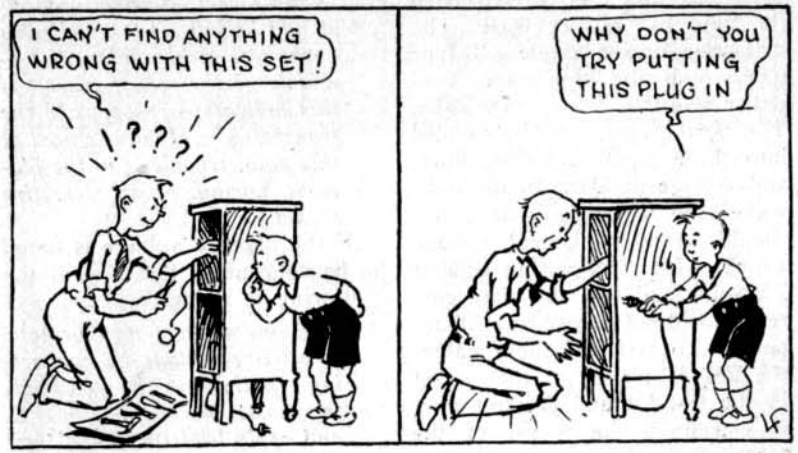
Interpreting Set Analyzer Readings

By A. E. Hoover

The advent of the set analyzer has been the greatest step forward in the business of servicing radio. Before it came to be a necessary part of every serviceman's equipment, much service work was just ordinary guesswork. The analyzer has eliminated the guesswork. If it did this alone it would be invaluable, but it has gone further, in that by its efficiency it has greatly speeded up the work.

Analyzers are built in a great many forms, some having one or two meters, others having five or more. Regardless of the number of meters used they are all designed to do the same things. They measure filament, plate, grid, and screen voltages and plate current. The modern kit should have at least two meters: an alternating current voltmeter and a combination volt and milliammeter. The alternating current voltmeter should have ranges of 0-5, 0-15, 0-150, and 0-800 volts. The direct current voltmeter should have scales of 0-10, 0-100, 0-1000 volts. The milliammeter should read 0-15 and 0-100 milliamperes. All these scales should be available through the test plug and externally by the use of test leads. It is not necessary the scales mentioned be exactly as described, but they should be of approximate range; otherwise complete readings on all sets cannot be accurately made. If the pocketbook permits and greater size is not a drawback, kits containing more meters may be selected. A kit containing five meters will read the four voltages and the plate current simultaneously with a minimum of switches or buttons to be used. Kits containing fewer meters require more switching in order to accomplish the same results.

Regardless of the type of test kit used, it is valuable only in the degree in which its user understands it. It shall be the purpose of this writer to describe the use and tell how to correct the troubles which the analyzer detects.



One of the requirements of a good serviceman is that he should thoroughly know the characteristics of all types of tubes in general use. Tube manufacturers furnish tables of characteristics of all tubes they make, or the data sheet enclosed in each tube carton may be studied. Regardless of how the information is obtained, MEMORIZE IT! The importance of such knowledge cannot be overemphasized, especially when it is realized that the radio set is merely a means of controlling the action of the tubes used.

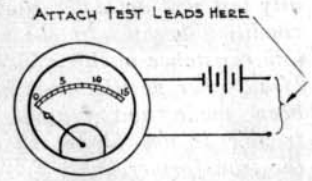


FIG. 1

The simplest and yet one of the most important things which an analyzer will do is to make continuity tests. Most kits contain a small 4½ volt C battery for this purpose, or if not, one can easily be connected in. It should be connected in series with the low range direct current voltmeter and tests leads should be provided as in figure 1. By touching the test leads together the meter is connected directly across the battery and a reading of 4½ volts will be obtained. In testing various pieces of apparatus these test leads are connected to the terminals, and the meter reading is noted. No reading indicates the piece tested is open, full reading indicates it is shorted or of very low resistance, and partial reading indicates the circuit is closed through a high resistance. The description of tests to be made in following paragraphs will often refer to continuity, and the correct reading for normal conditions will be given.

We will consider first the tests to be applied to alternating current power packs. There are two types—half-wave and full-wave

This description is derived from the kind of rectifier used. The half-wave uses a single 281 type tube, and the full-wave uses either a single 280 or two 281's. The power pack may be divided into three parts—rectifier, filter, and voltage divider. In the half-wave type we know that a test should show a filament voltage (A.C.) of a value within 10% of 7.5 volts, and that the plate current should not exceed 85 milliamperes. To test for these values the 281 is placed in the socket of the test kit and the test plug is placed in the socket of the power pack. Pressing the button marked 0-15 A.C. we will read the filament voltage on the alternating current voltmeter. During this test the voltmeter is automatically connected directly across the filament of the 281. If we get no reading at all, any of the following may be wrong:

1. *No current reaching the primary of the power transformer. (Remove A.C. plug from outlet and apply continuity test to prongs of plug. Reading should be full or nearly full because of low resistance of primary winding. If the test shows open across the primary at the point where the A.C. cord is soldered on, the primary of the transformer is open and it will be necessary to replace it. If this shows closed, trouble is either in defective switch or cord.)*
2. *The filament secondary or wiring from it to the tube socket may be open. (Apply continuity test to the filament prongs of the socket. Normal reading should be full. If test indicates open, test at the filament terminals of the transformer. If this indicates open, replace the transformers. If it is closed at this point trouble is in the filament wiring or in defective socket.)*

If the filament voltage is found to be abnormally low, one of the following is wrong:

1. *The line voltage may be low. (Test line voltage by connecting test leads to the two binding posts marked 0-150 A.C. and apply leads to line. Meter should read between 110 and 120 volts.)*
2. *There may be a poor connection from the secondary to the tube socket, or the socket clips may be corroded. (Check wiring and clean socket contacts.)*
3. *There may be a short-circuit across the filter section. (This will be disclosed in following tests to be made in the plate circuit.)*
4. *The filament secondary may be partially shorted. (A continuity test will not detect such a condition because of the very low resistance of this winding. If all other possible tests have been made and reason for trouble is not found, change the transformer.)*

If the filament voltage is found to be abnormally high it will be found:

1. *The line voltage is too high. (Test line voltage as described in foregoing paragraph.)*
2. *The filament winding of the*

(Cont. on page 52)

secondary may contain too many turns of wire. (This may be corrected by inserting resistance wire in series with one side of the filament.)

If the filament voltage is normal, test for plate current by using scale marked plate current or plate mills 0-100. When this is done the milliameter is connected in series with the plate of the tube, so that all current drawn by the set must flow through it. We know that it should not exceed 85 milliamperes in any case, and in most tests it should be considerably less than this amount.

If the current exceeds 85 milliamperes, any of the following things may be wrong:

1. *Shorted filter condenser. (Make continuity test across terminals of condensers. A full scale reading indicates a short-circuit, and any condenser testing in this manner should be replaced.)*
2. *Shorted wiring. (In most packs the negative side of the circuit is connected to the metal base, and since the positive side of the wiring must lie along this base, insulation may break down under the high voltage strain and cause a short. In nearly all cases this will be readily noticed due to the arcing.)*
3. *Winding of either choke may be shorted to its core or case. (Unsolder all connections to the chokes and make continuity test from choke leads to frame. This test should show open. In some packs a loud speaker field is used in place of one of the chokes. If the casing of the speaker is grounded to the base of the pack, test the field in the same manner.)*
4. *Voltage divider may be shorted. (Generally due to breaking down of by-pass condensers. Make continuity test across the divider from the negative end to the various positive taps. These tests should show part scale reading indicating high resistance in the circuit.)*

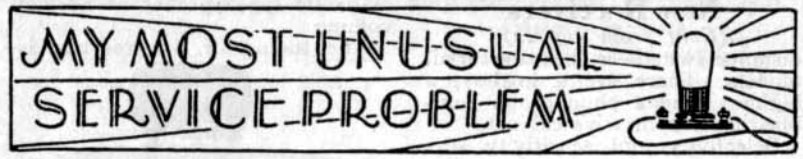
If the plate current reading is very low, it indicates that one of the following is wrong:

1. *High or positive side of wiring is open between a point past the first filter condenser and the highest output voltage. (Test from the positive side of the first filter condenser to the connections going to the chokes. An open reading indicates an open choke or open wiring between them.)*
2. *Open voltage divider. (Test across the various divider taps. Part scale readings are normal. An open reading will indicate the defective section.)*
3. *Partially shorted high voltage secondary. (Continuity test will not disclose the difference in resistance because of the fairly low resistance of the entire winding. Other tests which have been made will have eliminated all possible trouble in other parts of the circuit, and changing the transformer is the only remaining remedy.)*

If the plate current reading is zero, the following may be wrong:

1. *Wiring between filament of 281 and first filter condenser*

(Cont. on page 56)



Radio Sales and Service will pay $2.00 for each unusual service problem printed—mail them in

Simple Interference Solution

I recently aided in the solution of an unusual service problem wherein the use of shielded wire for a lead-in obviated the very expensive shielding of an elevator control system.

A dealer for whom I have done considerable work sold a resident of an apartment building a very sensitive set. Upon installing the set it was found that interference in the form of intermittent series of clicks made reception unpleasant.

With the aid of several persons and some special locating equipment it was found that interference originated in the elevator control equipment.

The estimated cost of shielding the control system made that method of suppression of the interference impossible. Use of shorter antenna did not lessen the disturbance.

The next step was to replace the antenna lead-in with shielded wire. This very greatly decreased the interference, and changing direction in which the antenna was stretched resulted in further improvement.

Thus at a very low cost a satisfactory solution was secured. The interference was not eliminated at its source, which would have been extremely costly, but the antenna system was prevented from picking up the unwanted radiations. *(C. E. Rudelius, Hammond, Ind.)*

Shorted R.F. Transformer Kills Sensitivity

My most unusual service problem occurred recently while servicing a Buckingham a.c. receiver. The customer stated that while the set operated satisfactorily on locals, it did not receive any out-of-town broadcasts. The tubes were tested on a tube checker and the set voltages measured with my analyzer. All the tubes were passable, and the set voltages were almost exactly those specified for the set.

Next I moved the antenna from grid to grid in the r.f. stages, which showed there was no increase on the signal strength due to the second r.f. stage. When I removed the chassis from the cabinet and made continuity tests on the primary and secondary windings of the 2nd r.f. coil, I still found no trouble.

However, as the coils were sealed in cans, I decided to remove this coil for inspection. I immediately found the secondary to be badly burned, with many turns shorted. — *E. O. Osterman, Chicago, Ill.*

New Receivers

(Cont. from page 24)

distance switch—is the same for all models. There are a lowboy, a highboy, and a phonograph combination in a massive cabinet.

Selectivity and sensitivity several times greater than in earlier sets are claimed for these models.—*October Radio Sales and Service.*

1931 Kellogg Receivers

A new line of sets has been announced by the Kellogg Switchboard and Supply Company of Chicago, Illinois. A greatly changed

chassis is housed in two styles of genuine walnut cabinets, one highboy with sliding doors, and the other a lowboy with short legs.

Such features as tone-control, local distance switch, power-detection, and an adjuster to compensate for any type of aerial, are incorporated in the circuit employing screen grid tubes and push-pull amplification to secure very great sensitivity and realistic tone. —*October Radio Sales and Service.*

The De Forest Short-Wave Receiver

The CS-5 Receiver of the De Forest Radio Company is a four tube radio set designed to cover the frequency range of 15 to 200 meters. It is compact and extremely portable, yet has a signal strength sufficient to operate a magnetic type speaker at normal volume.

The tuning of this receiver is

just as simple and easy for the novice as is that of a broadcast set, it is claimed. Yet the results that may be secured will make it acceptable to even the most experienced operator.—*October Radio Sales and Service.*

Little Symphony Midget Receiver

The Sterling Manufacturing Company of Cleveland, Ohio, is manufacturing a midget receiver which incorporates the Loftin-White system of audio frequency amplification. Thus with only five tubes, sensitivity, selectivity and

volume are secured; this is very unusual in a set of this type.

Four New Stromberg-Carlson Sets

The Stromberg-Carlson Telephone Company of Rochester, New York, are producing four series of radio receiving sets this season. All models make provision for electrical reproduction of records. There is one model having facilities for the mounting of a turntable and pickup in the console, some time after purchase, if it is desired.

The Model 14 is the most comprehensive of all four. It contains several features unique in radio set design. Tuning may be done when a silent key has disconnected the speaker, and the deflection of a needle on a meter shows when the stations are tuned in. An automatic record changing device, with a capacity of twelve records, is also built in the console.—*October Radio Sales and Service.*

Introduce Clarion Junior

The Transformer Corporation of America, Chicago, Ill., has announced their new Clarion Junior which they will market as "the Mightiest Midget on the Market." The specifications of the set are: Tone control, dynamic speaker, push-pull 245's, triple screen-grid r. f. amplification, screen-grid power detector, phonograph jack, local-distance switch, illuminated dial, and an attractive walnut cabinet. Unusual selectivity and sensitivity are claimed for the Clarion Junior.—*October Radio Sales and Service.*

Majestic Superheterodyne

Grigsby-Grunow Company of Chicago, Ill., announce the Majestic Model 52, a screen-grid radio receiver of the reduced highboy type. A very highly developed superheterodyne circuit is employed, using eight tubes: three type '24, one type '27, two type '45, and one type '80 rectifier. Speaker, volume and voltage controls are all an integral part of the chassis.—*October Radio Sales and Service.*

A Superheterodyne with Ten Tuned-Circuits

The new superheterodyne receiver made by Silver-Marshall, Inc., of Chicago, employs ten tuned circuits to secure a selectivity which will permit reception of distant stations on channels adjacent to powerful locals. Despite this extreme selectivity the higher audio tones are faithfully preserved, reproducing evenly over a range of 40 to 4000 cycles.

The circuit utilizes dual preselection, preceding a screen-grid first detector tube, a '27 oscillator, two screen-grid intermediate r. f. amplifiers, and a screen-grid power detector. The detector feeds directly into the 245 push-pull audio stage.

These receivers are available in swell-front lowboy cabinets, profusely embellished with carvings.—*October Radio Sales and Service.*

Howard Radio with Optional Remote Control Tuning

As optional equipment on its new screen-grid radios, the Howard Radio Co. of South Haven, Mich., is presenting the "Synchro Dial," which permits tuning and adjustment of volume control from any number of remote positions desired by the operator. It enables any station to be tuned regardless of the position of the dial.

For this season, there will be five models, including one with automatic volume control and a combination embodying special audio amplification for best reproduction of recorded music. — *October Radio Sales and Service.*

The Master Midget Set

A receiving set of the popular midget type is made by the Master Radio Manufacturing Company of Los Angeles, California. Using six A. C. tubes, very good volume, selectivity and sensitivity are secured. The large Magnavox dynamic speaker reproduces with excellent fidelity.—*October Radio Sales and Service.*

Good Demonstrations Sell Radios

(Cont. from page 13)

servicemen call on customers about every six months to make sure their sets are operating satisfactorily. We are not unselfish in making these calls, because it results in the sale of tubes, and customers give our servicemen a lot of tips about prospects."

"How do you find business this year?" I asked.

"Well, we have to work lots harder to get it than in times past. It takes nearly three times the effort of a year or so ago. People don't come in very often and ask to buy a radio set—so we have to go out and get them. By working longer hours we are able to keep our volume up. Of course, the business is there—we just have to go out and get it."

About one this Miss Zeitler was indignant. "We are closed three nights a week during summer, but we have to stay open every evening for several months out of the year. If all the radio stores would use their heads this would be unnecessary. We'd all sell just as many sets if everybody closed regularly three evenings a week.

Interpreting Set Analyzer Readings

(Cont. from page 52)

open. (Continuity test from filament connection of socket to the positive side of first filter condenser will give the indication.)

2. *Wiring between the negative end of the high voltage secondary and the point where this wiring is grounded may be open, or high voltage secondary may be open. (Test from plate terminal of 281 socket to base or B— of power pack. Normal reading should show closed.)*

In all the tests that have been outlined it has been assumed that the rectifier tube itself has been eliminated as a possible source of trouble. A shorted rectifier will cause a large amount of current to flow in the secondary circuit and will evidence itself by arcing or extreme heat within the tube. The plate will ordinarily become red hot. A low emission rectifier will be evidenced by a falling off of plate current. In every case of trouble be sure that the tube is good before making any further tests.

One Stage Audio Sets Need Boost

(Cont. from page 38)

as well as with many sets having two stages, when greater volume was desired. By designing the impedance of the transformer primary specifically for the pack-up, reproduction is superior to methods where impedance matching is not nearly so accurate.

Out of every ten razors in the state of Georgia, only six are used for shaving. The other four are used for social purposes.

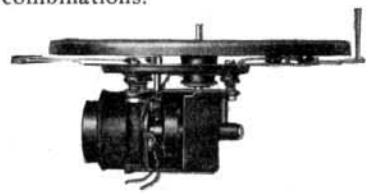
Mistress: "And did you have a honeymoon, Mandy?"

Mandy: "Well, Rastus done helped me wid the washin' the first week."

(Cont. from page 25)

The "Aristocrat" Phonograph Motor

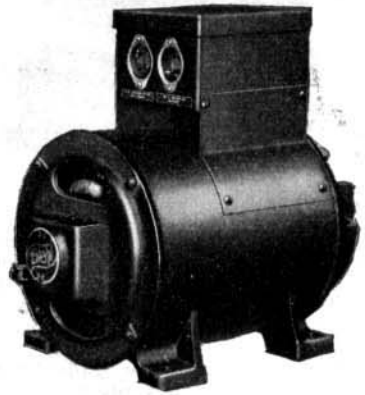
The Diehl Manufacturing Company of Elizabethport, New Jersey, has developed a new electric turntable motor which is very suitable for use in radio-phonograph combinations.



Turntables rotating at either 78 or 33 r.p.m., or all voltages and frequencies, may be secured.—*October Radio Sales and Service.*

D.C.-A.C. Converter

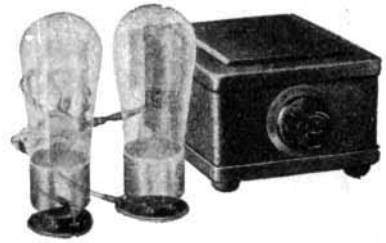
To operate A. C. radios from D. C. sources a converter such as the Diehl "Inductor" is necessary.



This unit will supply up to 150 watts at 110 volts. Due to correct design, accurate construction, and the use of ample filters, a radio set operated from this unit will be just as quiet as when the A. C. lines are used as the source of current. The convertor is very quiet, and is so free from vibration that it may be placed in the console without disturbing the operation of the set in any way. The Diehl Manufacturing Co. of Elizabethport, N. J., supplies this unit for use in 32, 115, or 230 volt direct current.—*October Radio Sales and Service.*

Full Range Tone Control

The Radiart Corporation of Cleveland, Ohio, has developed a new type of tone control adaptable to any existing radio receiver. By employing a bridge circuit with inductance and capacity an unusual



range of control is secured. It is able to increase the brilliance of the treble above normal reception, as well as deepen and mellow the bass. —*October Radio Sales and Service.*

Standard Tone Control

A very low price tone control of the usual type has been developed by the Radiart Corporation of Cleveland. This model, the "Standard," is adaptable to all types of sets and requires only an adapter to be placed under the power tube for its installation. The use of this

piece of equipment is a very economical method of bringing a set up to date. There are also models available for panel mounting.—*October Radio Sales and Service.*

A Tuned Electrical Pick-Up

The Audak Company of New York, New York, have developed a tuned phonograph pick-up unit which eliminates many of the usual troubles encountered in these instruments after a period of use.

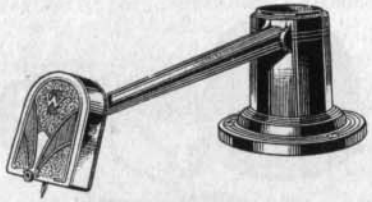
It will be found that the pick-up unit gets out of "tune" at times, or that equal sounds will not be produced as to pitch and volume.

pole pieces. With these new units a simple adjustment will correct this fault and the unit will again operate with the greatest efficiency.

Units embodying this feature are made in three models, including the Universal for mounting on any tone arm, and the Professional for talking picture application.—*October Radio Sales and Service.*

New High Volume Phonograph Pick-Up

The Webster Electric Company of Racine, Wisconsin, has developed a new pick-up in their model



4-A, for electrical reproduction of records that is especially suited to the latest types of receivers. This high volume unit is very desirable for use with screen grid sets having low gain audio stages.

Thirty-seven per cent cobalt steel magnets of very high permeability are used. The accurate balance of the head, putting correct pressure on the needle and ball-bearings in the base for free swing over the record, are important factors in securing a remarkable frequency response.

An adapter and separate volume control with connecting leads are furnished with each unit.—*October Radio Sales and Service.*

New Janette 32 Volt Converters

The Janette Manufacturing Company of Chicago announces a complete new line of 32 volt Rotary Converters for radio and talking machine use. This con-

verter changes 32 volts direct current, such as supplied by a number of farm lighting systems, into 110 volt, 60 cycle, alternating current, and are available in output capacities of 105, 210, and 315 watts.

The converters for radio use are equipped with a filter, a cord and plug connection for the D. C. circuit, and a receptacle for plugging in the radio.—*October Radio Sales and Service.*

Electric Calendar Clock

The recent revelation of the "Mystery Model" electric clock by the Hammond Clock Co., Chicago, The new Gregory model now in-

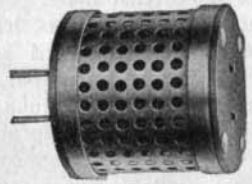
cluded in the Hammond line of Ill., brings to light a new product of the electric clock industry.
synchronous electric clocks not only

gives the exact time from the light socket, but in addition gives the day and date as well.

Day and date indicators change automatically at midnight.—*October Radio Sales and Service.*

Automatic Voltage Regulator

A compact and low priced automatic line voltage regulator is manufactured by the Clarostat

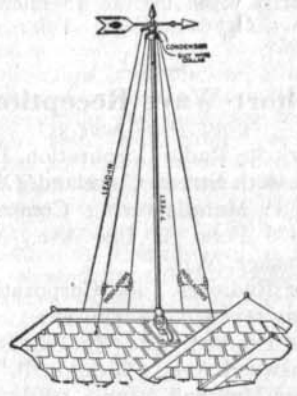


Manufacturing Co. of Brooklyn, N. Y. It may be quickly installed on any radio set to protect the tubes from high voltage surges.—*October Radio Sales and Service.*

A Combination Weather Vane and Antenna

A unique antenna which consists of a red arrow weather vane mounted on an attractive aluminum staff is announced by Yahr and Lange, 208 E. Water St., Milwaukee, Wis.

The pick-up capacity of the Red Arrow Antenna, as it is called, with the vertical pick-up of four 12-foot guy wires, is equal to the conductive surface of a 75-ft. aerial. A patented bakelite con-



denser with the four-way guy wire collar beneath the red arrow acts as a neutralizer for the entire system, it is claimed, and clarifies the tone as well as insulates the antenna system proper from the staff. A special antenna base of aluminum is available for conveniently securing the staff to the roof.—*October Radio Sales and Service.*

Combination Ohmmeter and Capacity Meter

The combination ohmmeter and capacity meter just announced by

Co. of Cleveland, Ohio, is a type the Hickok Electrical Instrument of instrument new to the radio service field. The unit is comprised

of two meters: one arranged to read values of resistance in two ranges, 5-5,000 ohms and 500-500,000 ohms; and the other reads capacity from 0.25 to 15 microfarads.—*October Radio Sales and Service.*

Short Wave Reception

(Cont. from page 33)

Workrite Radio Corporation, 1812 E. 30th Street, Cleveland, Ohio.

J-M-P Manufacturing Company, 3435 Fond du Lac Ave., Milwaukee, Wis.

Pilot Radio & Tube Corporation, Lawrence, Massachusetts.

Aero Products, Inc., 4611 E. Ravenswood Ave., Chicago, Ill.

Silver-Marshall, Inc., 6401 W. 65th St., Chicago, Ill.

Schools Afford Good Market for Radio

(Cont. from page 30)

Working for a Radio for Our High School". They were assigned to districts and ordered to make a house to house canvass, bringing back lists of persons who were in the market for radios. Of the prospect names gathered by this class and submitted to this dealer during the contest, twenty-five resulted in sales.

At Evanston, Illinois, the students of the Township High School won seven Orthophonic Victrolas last year and this year intend to work for a Victor radio by collecting old Victor records. Mr. George Davidson of the North Shore Talking Machine Company donated the Orthophonics, one for every fifteen hundred records turned in. During the drive, which was carried on by the individual home rooms amid keen rivalry, much publicity in the school's weekly publication was given both the contest and the donor. The profits to Mr. Davidson came from the publicity which his music shop received at the hands of 2400 students.

Are Your Customers Tube Conscious?

(Cont. from page 16)

dealer at 1624 Belmont avenue, Chicago, who has been practising it for over a year. "It supplies a real service which is appreciated by our customers. By catching and repairing defects before complaints are necessary, we are shielding ourselves against dissatisfaction and ill-will. Satisfied customers are our greatest advertisers, and frequently new customers are prospects picked up by the service men while checking the sets of old customers."

Manufacturers of tubes, having anticipated the backward swing of the pendulum, are prepared to assist retailers in their "tube conscious" drives with helpful advertising and display suggestions. These are available by merchants who agree with Evan M. Klock, assistant advertiser of Lyon and Healy, Chicago, when he declared recently:

"Nothing is too insignificant with business as it has been the last six months. The sale of tubes is as important an item as the sale of pianos and radio sets, and should bring in good returns to the dealer who will go after that business through a 'tube conscious' campaign."

An Encyclopedia of Set Analyzers

(Cont. from page 43)

Selection of the desired test is made by means of three rotary switches. All meter scales are brought to binding posts on the panel, for separate use.

The unit is mounted in a black bakelite case, with a removable lid. The price net to the dealer is $93.75.—*October Radio Sales and Service.*

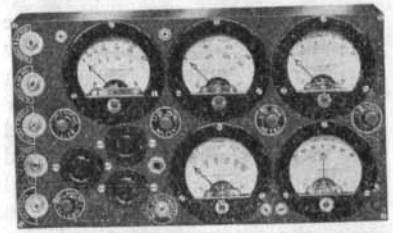
Weston Model 565

This set analyzer is similar to the 547 instrument, with the exception that additional instrument ranges, a radio frequency oscillator, a direct reading ohmmeter, and a tube checker are incorporated.

A loose-leaf instruction book furnished with each analyzer permits the addition of data on additional types of sets as soon as it becomes available. The net price is $140.63.—*October Radio Sales and Service.*

Hickok Radio Set Tester

The Model SG-4600 Set Tester consists of five Hickok instruments and two types of tube hold-



ers mounted in a solid bakelite case.

The use of five meters enables the operator to read all values at once, and the liability of burning out any of the meters under tests by operating the meters on the wrong scale is made impossible.

Complete with all lead equipment, the price is $140.00. A leatherette carrying case is $10.00 extra.—*October Radio Sales and Service.*

Burton-Rodgers Set Analyzer

The Burton-Rodgers set analyzer is a very complete but compact instrument. New tests made necessary by recent developments in radio set design are fully provided for.

Operation is simple, one selector switch being used to connect the ranges of the two meters to points under test. For safety of the meters no reading is obtained until button which operates desired meter is depressed.

The carrying case is of molded bakelite. A 44-inch cord is used for connecting to the radio set socket. Voltmeter test leads are also supplied. Net price to dealer is $58.50.—*October Radio Sales and Service.*

Supreme Model 90 Set Analyzer

The Supreme Model 90 Set Analyzer permits all set conditions to be measured by a single meter. This is of the copper-oxide type which gives accurate readings on both A. C. and D. C.

With the use of a single very versatile meter, operation of the tester and interpretation of the results become very simple.

A self-contained flashlight battery for continuity tests is provided.

The dealer net price is $78.50.—*October Radio Sales and Service.*

The Supreme Diagnometer

The Supreme Diagnometer is designed so as to test tube voltages and currents, for all existing types of tubes, and also provide a radio frequency signal for neutralizing and synchronizing. It is possible to check tubes, or make continuity tests without batteries or the use of a radio set, the power being supplied from a light socket transformer. Three meters are incorporated: a four scale D.C. voltmeter, a four scale A.C. voltmeter, and a three scale milliammeter. Plunger type switches are used to select the circuit to be

tested. A panel is mounted on the side of the containing box, upon which are a number of sets of pin jacks, enabling any of the meter scales to be used separately.

This instrument may be had in a compact carrying case for $139.50. — *October Radio Sales and Service.*

Sterling All-Purpose Tester

The Sterling Set Analyzer is equipped with sufficient meters to allow simultaneous reading of all the important values about a radio set. Six meters are employed, it being necessary to have only two scales on each.

The instrument tests all tubes including screen grid type. A socket connector permits checking conditions at each socket or stage of the radio set. The list price is $67.50.—*October Radio Sales and Service.*

Greater Radio Sales Through Interference Reduction

(Cont. from page 41)

Since loose contacts are the fundamental cause of radio noises, it is first advisable to inspect all wiring in the building, tightening loose lamps or fuses, and making sure that all attachment plugs make firm contact in receptacles. The aerial and ground of the radio set must not be overlooked in making this check.

The next step is in an investigation of the various appliances used in the building; oil burners, refrigerators, vacuum cleaners, electric kitchen aids, as well as pump motors, ventilator motors, and other electrical appliances, are frequently the cause of interference.

When a source of interference is located the troublesome radiations may be stopped at the point of origin, or sometimes it is sufficient to prevent their being picked up by the receiver through the antenna system or power supply.

The method to be used depends upon the cause of the interference and the location of the set with regard to its field of radiation. Absolute elimination of the interference requires the sources be completely shielded with metal, preferably copper, and a filter placed in the power lead, lest interference be radiated through the light lines.

It is often possible to obviate the use of shielding, which is very costly, by bonding together all metal parts of the machine and grounding the whole. Oil-burners, ice machines, and vacuum cleaners may usually be silenced by the use of the filter alone.

Many times it is found that the interference originates near the receiver or antenna system. It may then be possible to move the antenna out of the radiations, and by using shielded lead-in and ground wires secure undisturbed reception. Often it is practical to move the antenna as far away as several hundred feet, using shielded lead-in wire to carry the signals through the zone of interference.

In such instances it may be advisable to use a filter in the power supply lead of the receiver to prevent undesirable radiations from entering the set in this manner.

Condensers Deteriorate Constantly

(Cont. from page 45)

He immediately decided on a new service policy. Now he buys a complete block on which he is able to make a nice profit at $10.00, and he has found it comparatively easy to induce his customers to let him do a first class repair job when condensers are involved. He explains to them that poor condensers have many burn-outs and will almost invariably cause trouble in the transformer which must be replaced when it burns out, as it cannot be patched.

I happened to pass through Jim's town a few months later and found that Jim had done considerable investigation regarding replacement condensers. He had been puzzled by the fact that he encountered so many various bypasses and condenser filter blocks in his service work. Each set seemed to require different capacity and voltage ratings. Mechanical sizes for condensers of similar specifications varied radically, and he had great difficulty in selecting a stock sufficiently versatile to take care of his requirements.

But Jim had found a solution in the fact that not only set manufacturers have replacement condensers for their sets, but that condenser manufacturers have completed their files with condensers exactly meeting every specification for practically every set that has a large sale, and that he could get remarkably good service.

» » NEW

THE JEWELL PATTERN 209 TUBE CHECKER

REG. U. S. PAT. OFF.

IN THE Pattern 209 Tube Checker Jewell has again produced a service unit which provides a value not equalled by any other equipment on the market today.

For example, the Pattern 209 provides true voltage for testing every tube; 3 volt tubes are not tested with 2.5 volts on the filament or vice versa. Takes care of new 2 Volt Battery Tubes.

The shunt push button actually changes the range of the instrument and does not simply place a high resistance in series with the circuit to cut down the reading and make all tubes appear similar on the high range.

The grid test button shifts the grid biasing potentional from one definite value to another; *this is the most effective and accurate method of making grid tests; be sure it is provided in tube checkers you buy.*

A chart giving expected readings is molded in the surface of the tester.

List price $30.00. *Dealers' net price $22.50.* Mail the coupon.

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Mail your 16-page Service Instrument Bulletin describing Jewell Pattern 209 Tube Checkers and other time saving service instruments.

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