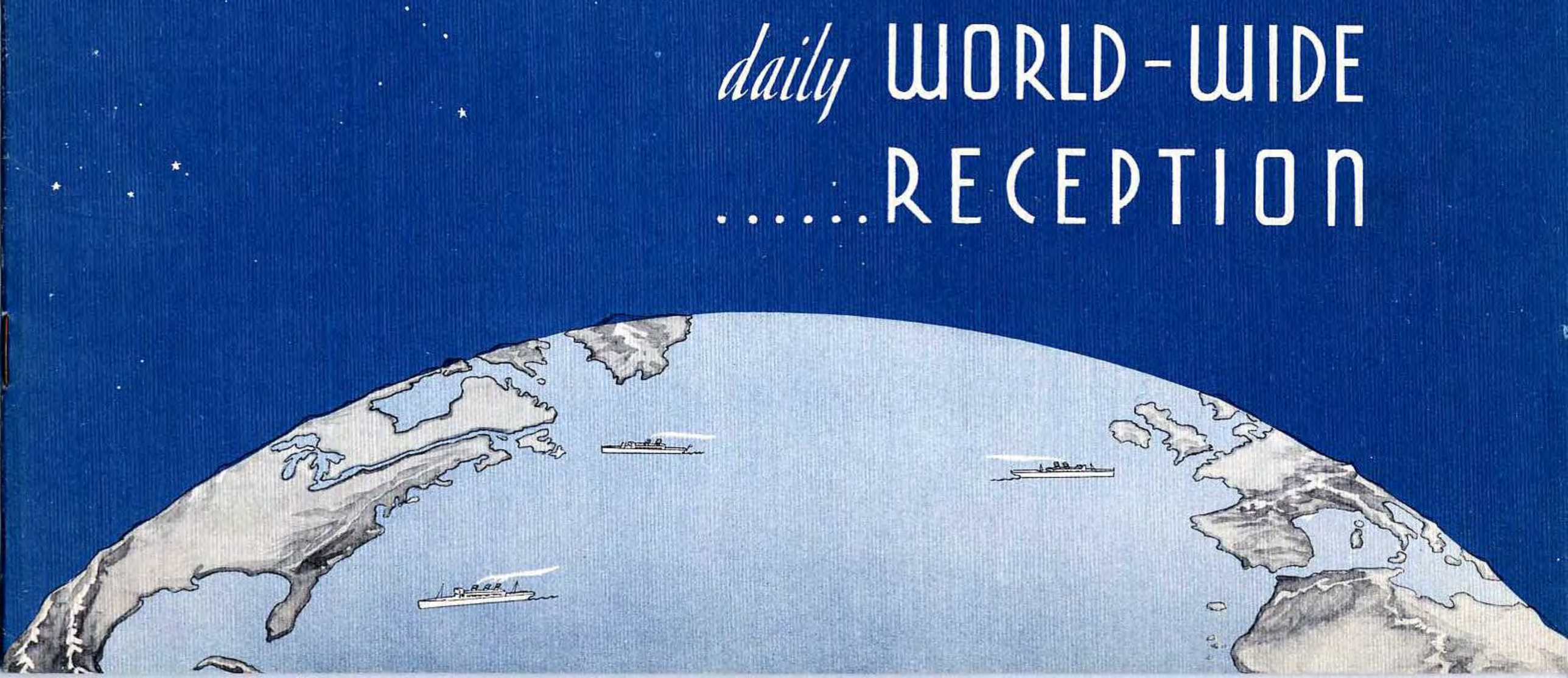
Technical description *of* THE ONLY RECEIVER GUARANTEED TO GIVE *daily* WORLD-WIDE .....RECEPTION

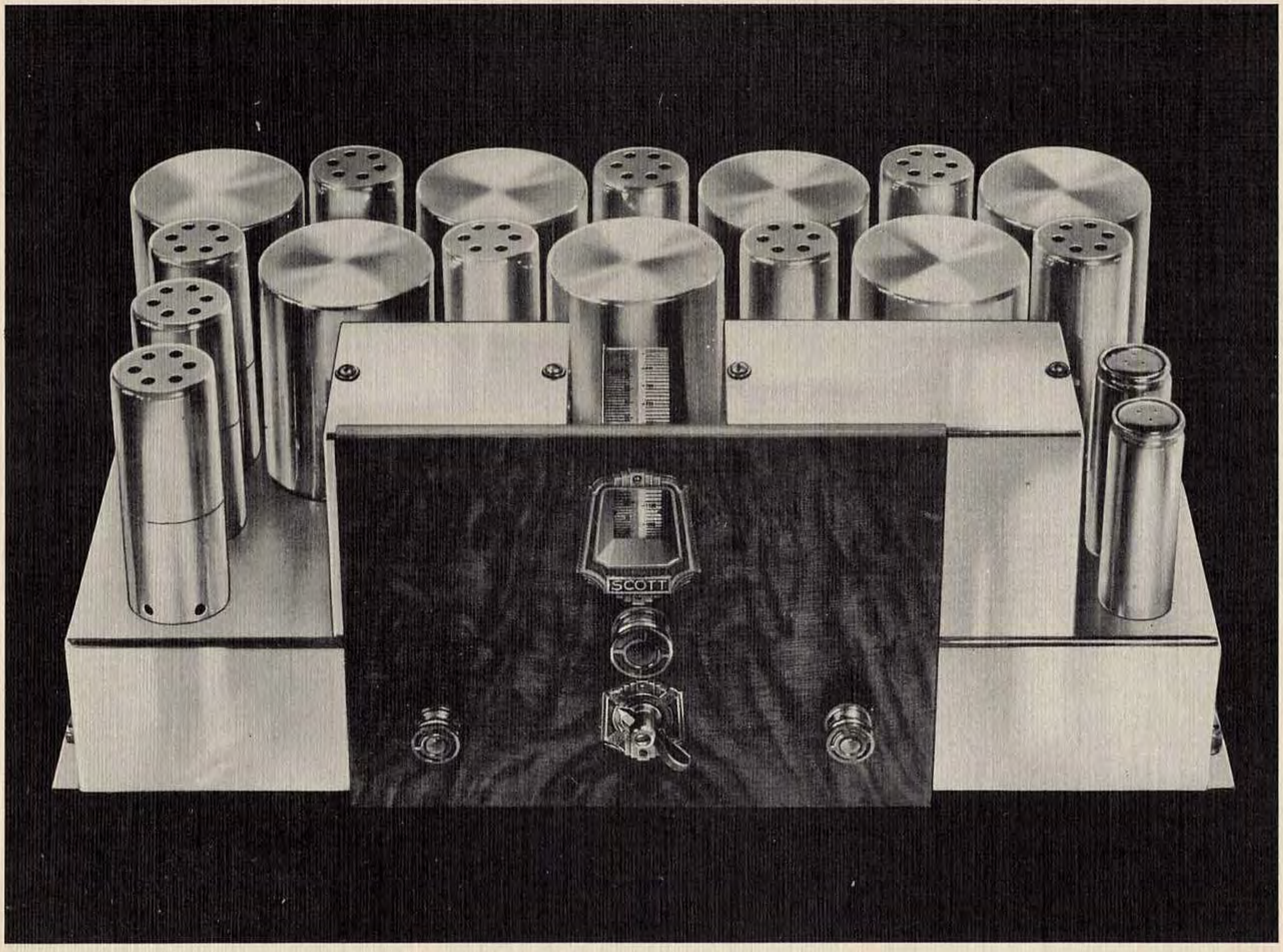


The SCOTT ALLWAVE DE LUXE MODEL SUPERHETRODYNE

Into the design of this new model SCOTT ALLWAVE DELUXE has gone the experience gained in designing and building nothing but high powered superheterodyne receivers for over eight years. So advanced has been their design, that they have, for many years, held ALL verified World's Records for the consistent, regular reception of foreign broadcasting stations. The latest of these records, which is fully verified, is the reception at loud speaker volume at Chicago, of *EVERY* program (except three) transmitted from an Australian station, 9,500 miles distant, for TWELVE CONSECUTIVE MONTHS.

I believe the DELUXE has incorporated in its design so many new and advanced features, giving such extreme efficiency, that its reception range and tonal perfection will not be duplicated by any other receiver for some considerable time to come.

This new SCOTT ALLWAVE DELUXE model is the result of many months of intensive laboratory research. Plug-in coils are generally regarded as the most efficient means of changing from one wave length to another on the short waves. While it is a simple matter to eliminate plug-in coils by using tapped inductances (the method used in most of the Allwave receivers recently introduced that do not use plug-in coils) this system reduces the sensitivity and selectivity so greatly that its use could not be tolerated in the design of this new DELUXE model, and an entirely new system of changing from one short wave band to another has been developed which is actually MORE efficient than the plug-in coil system. This and many other new and advanced engineering features are fully described in this brochure.



THE SCOTT ALLWAVE DELUXE CHASSIS

The Circuit

Brief Specifications—Superheterodyne—Twelve tubes—Pre-Selector stage using a 51 Variable-Mu tube—1st Detector using type 224 screen grid tube—Oscillator using type 56 tube—Three stages of I.F. amplification with 4 tuned circuits and three type 224 screen grid tubes—Each stage is completely shielded and isolated from each other, and employs a new system of I.F. amplification, giving extremely high amplification without loss of stability—Second detector circuit using type 56 tube —Three stages of audio amplification, a combination of resistance and impedance coupling, using two type 56 tubes and two type 245 tubes, the last stage being pushpull—Rectification—One type 280 noiseless rectifier tube—Twin Laboratory matched speakers.

The Pre-Selector or R. F. Stage

The Pre-Selector or R.F. stage using a Variable-Mu tube on the short waves as well as the broadcast band, increases the signal strength applied to the 1st detector tube and the selectivity of the receiver.

The Oscillator and Detector Circuits

In the Oscillator circuit one of the new type 56 tubes is used, the characteristics of which make it particularly suitable for use as a short wave as well as broadcast band oscillator. The 1st detector or mixer stage uses plate rectification, and is coupled to the oscillator circuit in such a way that it not only gives perfect modulation, but at the same time automatically tracks or aligns the tuning of the two circuits, so that they can be operated by a single dial without loss of either sensitivity or selectivity from 15 to 550 meters, an important development of our Research Laboratory for which basic patents have been applied for. The single dial tuning, without trimmers, of *BOTH* oscillator and detector circuits, is an exclusive feature in the SCOTT ALLWAVE DELUXE and means all the difference between getting *ACTUAL* round-the-world reception, and merely tuning from 15 to 550 meters with a strictly limited distance range.

The Intermediate Frequency Amplifier

The gain or sensitivity of a superheterodyne receiver depends largely on the efficiency of the I.F. amplifier. Our extensive research in superheterodyne receiver design convinced us over three years ago that 470 KC was the ideal frequency for an Allwave receiver, although, at that time 175 KC was universally used by other superheterodyne designers. It is interesting to find that many of the more recently introduced receivers are now using an I.F. frequency between 460 and 480 KC, proving just once again the advanced ideas always incorporated in SCOTT RECEIVERS. The design of the I.F. coupling units is radically different to that employed in other receivers and is another product of our Research Laboratory. It consists of a highly developed tuned impedance coupled circuit in which each unit in each stage is perfectly shielded from each other and from the other circuits in the receiver. This system enables us to use the full amplification or gain of the screen grid tubes, heretofore considered impossible of accomplishment owing to the high noise level or tube hiss encountered with other methods of I.F. amplification. It is just another of the features in our receiver that makes consistent, dependable, reception of foreign stations possible.

The Second Detector

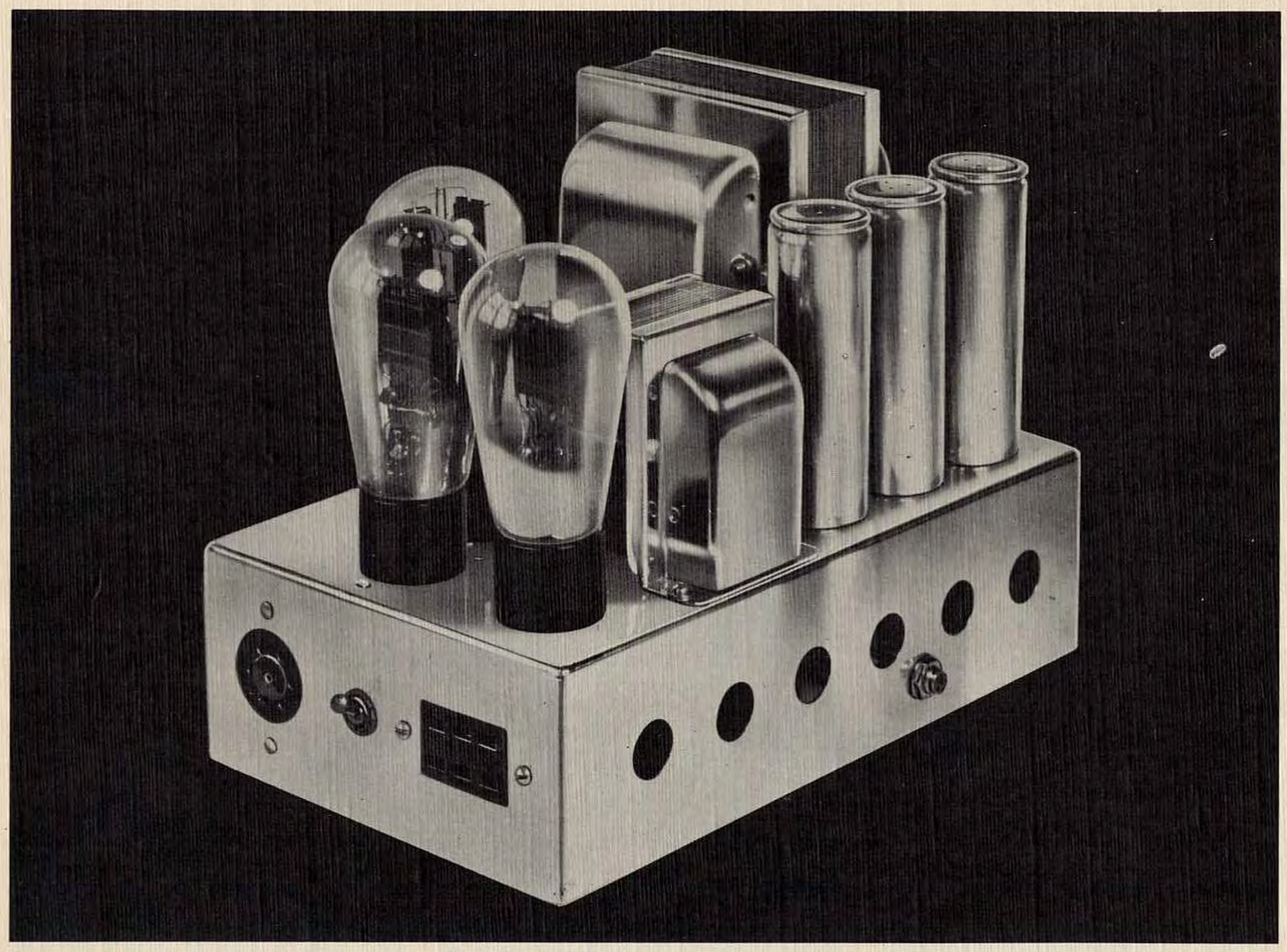
Power detection is used in the 2nd detector in a special circuit developed to give stability thruout a wide variation in power levels handled by the tube—one of the new 56 type. This stabilized circuit overcomes the distortion generally caused in the 2nd detector stage. It is this special detector circuit that is responsible in a large degree for the uniform response shown in our Fidelity curve, and freedom from wave form distortion.

The Audio Amplifier

The Audio Amplifier used in the DELUXE model is very similar in design to that used in high grade broadcasting station amplifiers. Laboratory curves show that the response of the amplifier is flat within plus or minus 2 db. from 30 to 8000 cycles, a remarkable degree of perfection in a broadcast receiver amplifier. Each stage is a Class A or linear amplifier. This system gives undistorted or linear output at any volume, from a whisper to volume sufficient to fill every room in the largest home with full clear tone. The Class A amplifier is used in preference to the recently introduced Class B amplifier, in order to obtain linear or undistorted output at ALL volume levels. This amplifier is free from wave form distortion, giving clarity and purity of tone, eliminating the fuzzy or mechanical sounding reproduction so noticeable in ordinary receivers. Since broadcasting stations do not modulate frequencies above 5000 cycles, and since a large part of the tube hiss and interfering noises such as static, etc., occur at frequencies above 5000 cycles, a low pass audio filter designed to cut off frequencies above 5000 cycles is incorporated in this amplifier, effectively reducing the noise level of the receiver, giving a degree of clear volume on extremely distant stations that has never before been accomplished with any other receiver.

Power Supply

The special power supply used in the DELUXE model supplies current for the receiver and also has incorporated in it the final or pushpull stage of the audio amplifier. For rectification a type 280 tube is used in preference to the type 82 Mercury Vapor tube recently introduced. The type 82 tube is not used on account of the high noise level that it introduces into a receiver. The very complete filtering system consisting of a liberally designed two-stage filter using 32 mfd.'s of capacity in conjunction with a large choke coil and the two speaker fields, eliminates every trace of hum. Power transformers, condensers and all other parts have such high safety factors that we believe they will never break down in service. So sure are we of this, that a five year guarantee against breakdown of any part is given with each receiver, while the average receiver can only be guaranteed for 90 days.



THE POWER SUPPLY FOR THE SCOTT ALLWAVE DELUXE

No Plug-In Coils Used

There are three principle systems used in Allwave receivers to change from one wave band to another (1) A tapped coil (2) Separate coils, the connections of which are changed by cam or selector switches (3) Plug-in coils.

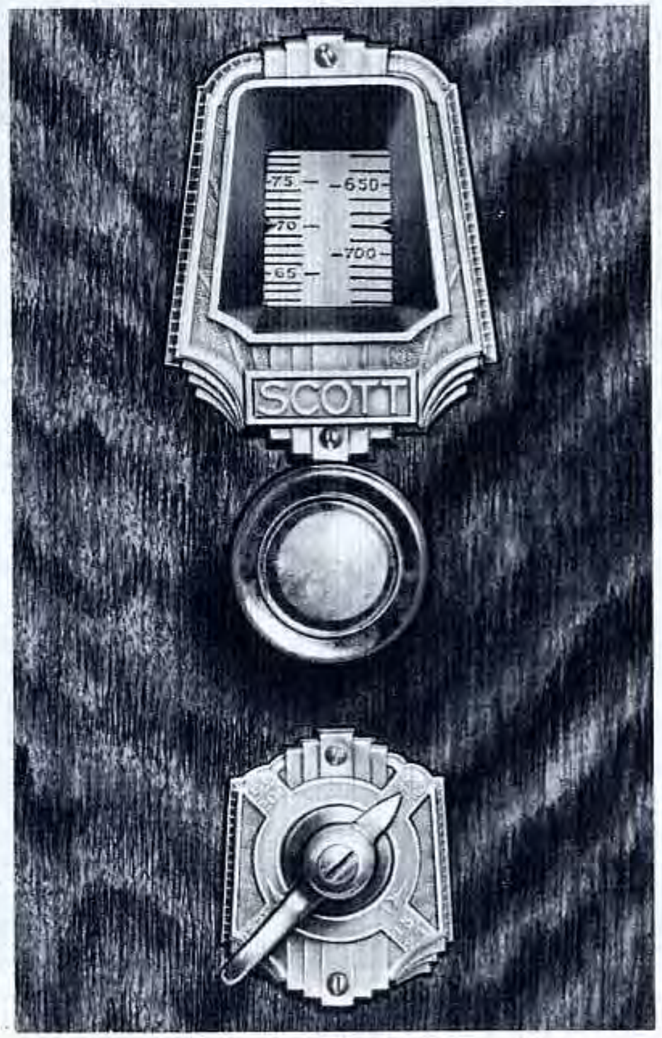
Tapped coils will change wave bands, but are not desirable because of the losses introduced which causes the sensitivity and selectivity of the receiver to be very poor. The system of using separate coils, connections to which are made thru cam or selector switches, introduces long leads to the tube sockets, and while the coils themselves may be efficient, these long leads tend to introduce feed-back and oscillation with consequent reduction of the sensitivity. Plug-in coils while efficient, are inconvenient to use.

The DELUXE model employs separate coils for each wave band in a mechanical coil changing device developed in our Laboratory, which not only overcomes the objections mentioned above, but is actually MORE efficient than plug-in coils, on account of the fact that the design enables even shorter leads to be used between the coils and the tube sockets than is possible even with plug-in coils. The coil changer is a marvel of mechanical precision, and over 12 months were spent in developing its design. All contacts are positive and self-cleaning. The complete coil changing mechanism is mounted within the base of the chassis, completely shielded and operated by a small lever on the front panel, making possible increased sensitivity and selectivity. The coil changing mechanism is shown clearly on page seven. The coil contacts will be seen directly below the two coils in the center and connect directly to the oscillator and R.F. tubes. These tube sockets will be noticed just at the back of the switch contacts. This illustration also shows clearly that only the two coils *actually in use* are connected in circuit, so eliminating all dead end losses.

Completely Shielded

To maintain stable operation and secure maximum selectivity, a receiver must be perfectly shielded. If the shielding is poor, coupling between circuits will occur with a resultant loss of stability, sensitivity and selectivity. The completeness of the shielding in the DELUXE model is shown by an examination of the illustration of the chassis on page three, and the bottom of the chassis on page seven. The top of the chassis shows that not one lead or tube is exposed. The bottom view shows the shield cans which isolate or shield the I.F. plate impedance from the I.F. grid impedance. A metal plate entirely covers the bottom of the chassis, completing the total shielding of the receiver. This complete shielding is conclusively proved by the performance curves, but a practical test can be made as follows:

Tune in a powerful local station; remove the antenna from the antenna binding post, and the receiver is absolutely "dead." Now remove the shield over the R.F. tube, and you find there is



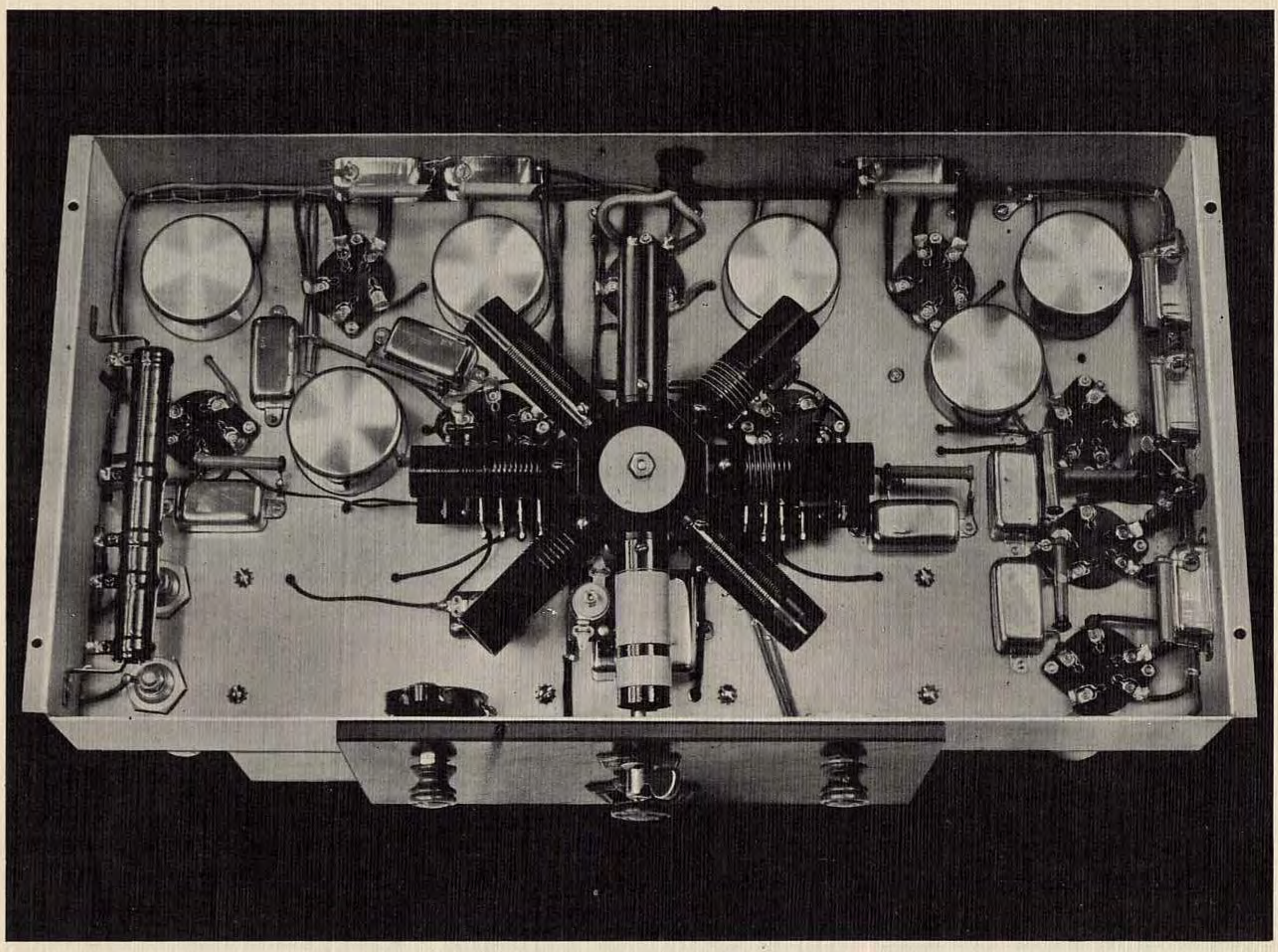
enough pickup in the few inches of wire which is now exposed on the lead to the top of the grip cap, to pick up signals with good loud speaker volume. Now replace the shield over the tube and the signal disappears. This experiment will quickly show why every tube and every circuit must be completely shielded, if maximum sensitivity and selectivity is to be obtained.

Single Dial Tuning

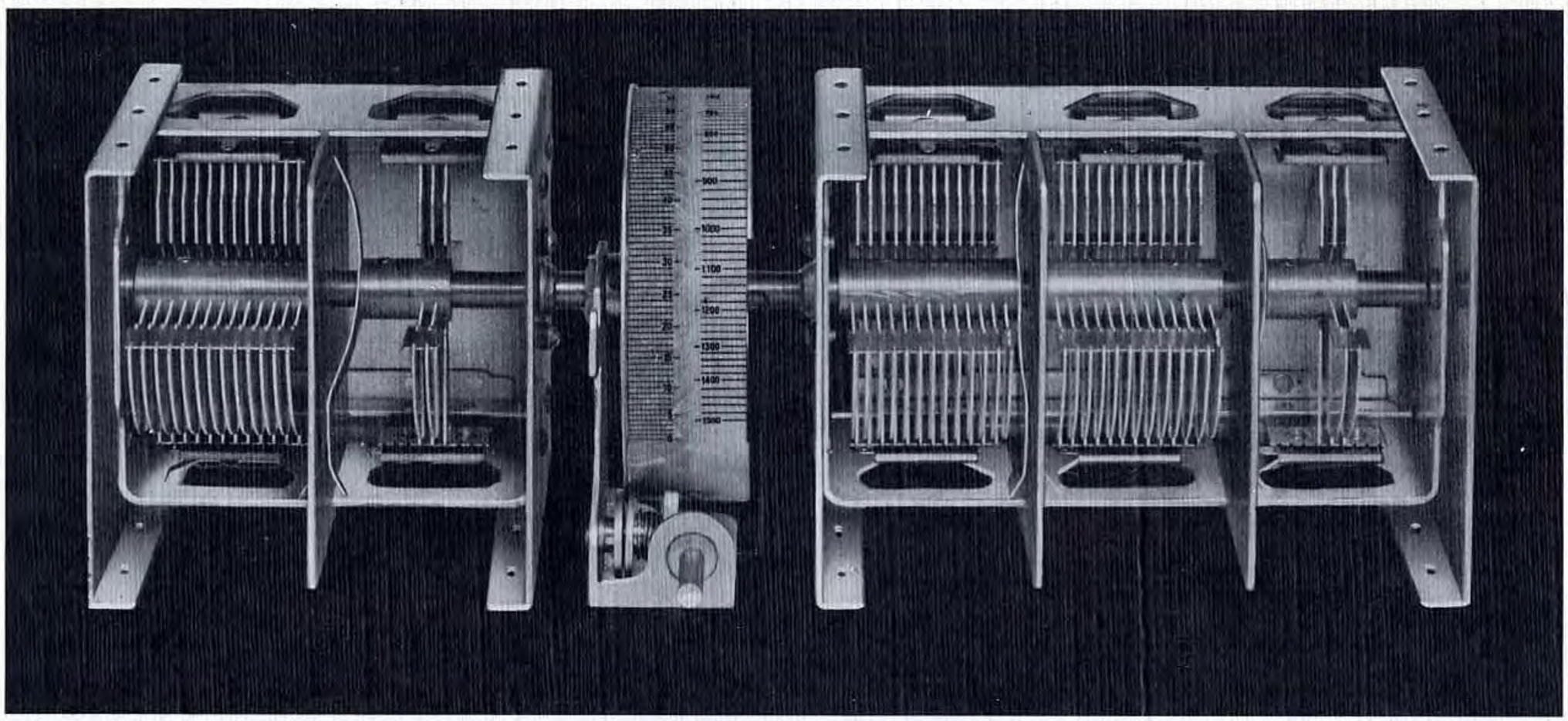
All tuning is done with one knob operating a single dial, without any other adjustments or trimmers, from 15 meters right up to 550 meters. While single dial receivers are common for the broadcast band, we believe this is the *first* allwave receiver that tunes more than one circuit on the short waves with a *single dial, without trimmers.* On other short wave receivers using a stage of R.F. ahead of the 1st detector, they have used either two dials or auxiliary trimmer condensers. A single dial has been used in receivers where the *oscillator circuit only* is tuned, but with a tremendous loss in both sensitivity and selectivity. The tuning of BOTH the R.F. and oscillator circuits with a single dial without trimmers is an exclusive development of our Research Laboratory, and only this system will give the sensitivity necessary to accomplish *daily world-wide reception,* regardless of season of year or atmospheric conditions.

New Slow Motion Dial

So fine is the tuning on this SCOTT ALLWAVE DELUXE model that a dial capable of micrometer adjustment and without the slightest amount of back-lash must be used. No such dial was available, so we have designed one that enables you to tune in a station "right on the head." No cords or strings are used because these stretch in time, but a positive mechanical drive, which with a very rigid construction eliminates every possibility of back-lash. To further insure the accuracy in calibration in logging, a thin line is projected across the dial from the back, enabling you to read the dial exactly from any angle either standing up, sitting down, or from either side. Points are embossed, however, on the escutcheon so that if the projection light burns out the dial can still be read as usual.



VIEW UNDER CHASSIS OF SCOTT ALLWAVE DELUXE



THE TUNING CONDENSERS AND DIAL USED ON SCOTT ALLWAVE DELUXE

The Tuning Unit

A 5 gang condenser is used to tune the short wave and broadcast band. To eliminate all possibility of microphonic trouble (usually caused by thin condenser plates) the frames are made extra heavy and the condenser plates are made from a special non-resonant alloy metal and are of extra thickness. To prevent any possibility of back-lash or wear in the condenser unit, the shafts are all mounted on ball bearings. The large 23 plate condensers tune the broadcast band, while the 5 plate condensers tune the short waves. A small switch automatically connects the S.W. condensers into the circuit when tuning on the short waves.

Tuning on the Broadcast Band

The dial strip is calibrated on the right side from 550 to 1400 kilocycles. The standards to which this receiver is built are so close that this calibration is guaranteed to be exact from the top to the bottom of the scale. If you wish to tune in a station at 700 kilocycles you can set your dial to that reading, turn up the volume and right on the dot will be the station. This accuracy is only made possible by keeping every unit, coil and part that goesinto its construction to absolute exactness, and taking special precautions to make certain that when all the adjustments on the completed receiver are finally made, they will remain constant indefinitely.

Tuning on Short Waves

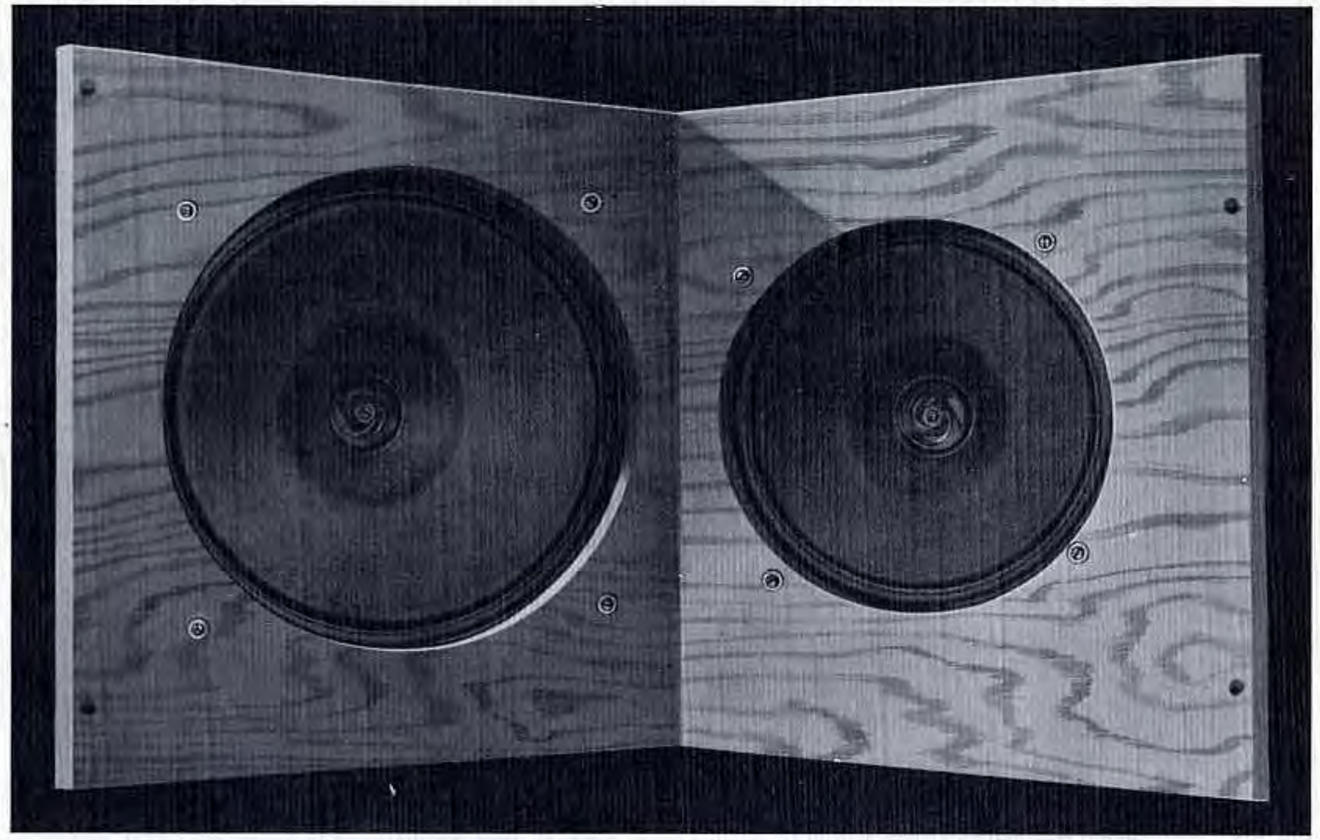
The simplicity of tuning any wave band on the short waves is clearly shown in the illustration on page six. The knob below the escutcheon is the ONLY control required to tune in EVERY wave length from 15 to 550 meters. Below this knob is the short wave selector escutcheon and pointer. The dial strip is marked in numbers from 0 to 100, and a unique calibrated Short Wave Station Finder is supplied with each receiver which enables you to tell in a second exactly where any short wave station comes in on the dial. It also tells you, if you have a short wave station tuned in that you do not know exactly what wave length it is transmitting on, the wave length of that station.

Twin Speakers

After designing an amplifier and receiver that laboratory curves proved reproduced frequencies not heard before, either on the very low or very high registers, it was necessary to design a speaker unit that was capable of reproducing faithfully the signals supplied to it. A single speaker, while capable of giving fine reproduction, cannot be designed to reproduce faithfully the very wide range of frequencies this receiver is capable of producing. Experiments proved that the road to tone perfection lay in the use of two matched speakers. This combination eliminates the peaks or resonances which sometimes causes "boom" on the bass notes, and tinny reproduction of the treble notes, so often noticed in production type receivers. The matching of these two speakers must be carefully done in the laboratory, otherwise, the results secured will not be as good as those obtained from a good single speaker. Where it is desired to install the receiver in your own console, the special baffle boards required are supplied with speakers.

Connections Provided for Phonograph or Microphone

This new model has connections to which can be attached either a phonograph pick-up or a microphone. A regular high impedance pick-up can be connected directly to these connections, or if it is desired to use a low impedance pick-up, which gives better reproduction on a phonograph record, or a microphone, they can be connected thru a suitable input transformer. If desired we can furnish a special control box which has the necessary transformer and volume control incorporated in it and a three position switch. This switch when placed in the first position, permits the radio receiver to operate in the regular manner; in the second position you may play back any phonograph record; and in the third position you can talk into a microphone and hear what is being said or played into it thru the speaker of the receiver. The volume control in the control box regulates the volume for either phonograph records or the microphone. The control box is so designed that it may be used for either a single or double button microphone.



THE LABORATORY MATCHED TWIN SPEAKERS
USED IN THE SCOTT ALLWAVE DELUXE

All Parts Protected from Climatic Conditions

All parts used in the SCOTT ALLWAVE DELUXE RECEIVER are specially treated to protect them from the effects of moisture, and this is particularly necessary where a receiver is to be used in locations near the sea coast or in tropical humid climates. If all parts are not protected in this way, a receiver loses its sensitivity and ultimately breaks down.

All coils are first thoroughly baked or dehydrated in a temperature controlled electric oven. They are then impregnated by a process which assures that they will maintain their characteristics and remain constant, even in humid tropical climates over a period of years. The audio transformers are hermetically sealed, as a precaution to prevent moisture entering and causing breakdown in damp locations. The field coils of both speakers are also treated with a moisture proof compound and a damp-proof glue is used on the speaker cones to assure continuous operation under even the most severe climatic conditions.

Finish

All metal parts, including chassis bases on both the receiver and amplifier, tube shields, coil shields, condenser covers, and even the parts under the chassis which cannot be seen, are chromium plated. This finish not only makes all metal parts rust-proof but insures that the receiver will preserve its beautiful finish for years, even when exposed to the air.

Test Laboratory Report on the Scott Allwave DeLuxe

About four years ago the Institute of Radio Engineers established a set of standards for the measurement of radio receiver performance. These standards are designed to indicate with exactness the efficiency of a radio receiver.

The curves shown on these pages prove quite conclusively that the new SCOTT ALLWAVE DELUXE RECEIVER is the finest radio instrument that has ever been developed up to this time. They prove beyond all question, that not only is it the most sensitive and selective receiver ever developed, but also that it is capable of giving more realistic and absolutely natural tone than has ever before been achieved in a mechanical instrument.

Selectivity

An examination of the Selectivity Curve of the SCOTT ALLWAVE DELUXE taken in the center of the broadcast band (1000 KC) shows the following selectivity.

100 times field strength.. 9 KC separation
200 times field strength..10 KC separation
5000 times field strength..20 KC separation

In other words, this curve shows that the DELUXE model can separate two stations without any interference whatever, and bring in a distant station through a local station whose strength is 200 times greater, at the receiving point, than the distant station just 10 KC away from it. It shows that it will bring in a far distant station through a local station with 5000 times greater field strength than a distant station separated from it by only 20 KC. This is indeed very remarkable selectivity, and we know of no other receiver that has ever attained such a high degree of selectivity.

Sensitivity

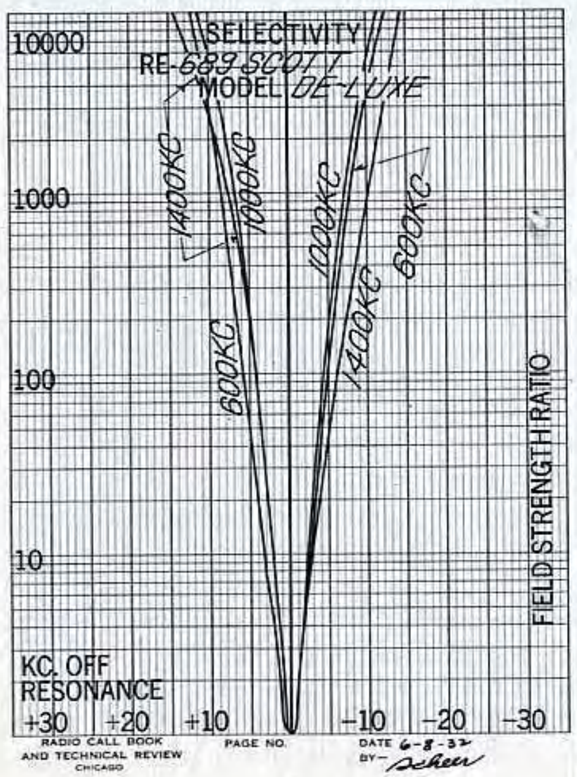
The Sensitivity Curve is designed to show what a receiver can accomplish in the way of the reception of distant stations. The lowest sensitivity that it is possible to plot on customary graph paper used for Sensitivity Curves is .1 microvolts absolute. The sensitivity of the DELUXE RECEIVER is so great that three-fourths of the curve could not be shown on it, as most of the curve is below .1 microvolt. Therefore, the graph paper had to be rearranged and starts at .01 of a microvolt instead of .1.

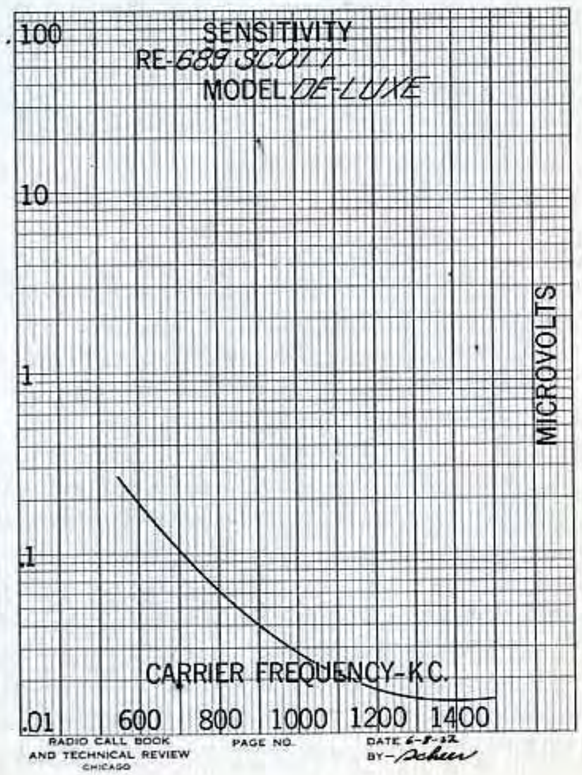
This explanation is given so that you will not be confused when comparing this curve with those of other receivers.

The Sensitivity Curve is based on a four meter antenna. It shows that at 600 KC, the sensitivity is .19 microvolts absolute, or .05 of a microvolt per meter. At 1400 KC the sensitivity is .016 microvolts absolute or 4/1000ths of a microvolt per meter. Such extreme sensitivity as this, makes practically every domestic station on the broadcast band a *local* station regardless of distance, and the tremendous proportionate sensitivity at the higher or short wave frequencies enables the SCOTT ALLWAVE DELUXE to bring in foreign stations over 10,000 miles distant, with the same useable volume with which it reproduces locals. Virtually, with this new degree of sensitivity, the whole world is local on the SCOTT ALLWAVE DELUXE. Actually, broadcasting stations in Germany, England, France, Australia, and dozens of other countries can be brought in with full volume.

This is such a tremendous and almost unbelievable degree of sensitivity that we are not showing the curves made in our own laboratories, but those made by one of the leading independent measurement laboratories in the country, that of the Citizen's Radio Call Book.

Many engineers have claimed that it is impossible to use sensitivity in excess of five or ten microvolts on account of the increase in tube noises when such a high degree of sensitivity is attained. In the average sensitive receiver a 30% ratio between noise and





signal strength is considered especially good. Most commercial receivers actually have a level of 60% to 80% noise at a sensitivity of three microvolts.

In the DELUXE model we have developed means of reducing noise many times below the usual level. With the volume control turned to a point giving a sensitivity of three microvolts, the percentage of noise is only 7½%. This figure is substantiated by the measurements made by the Citizen's Call Book.

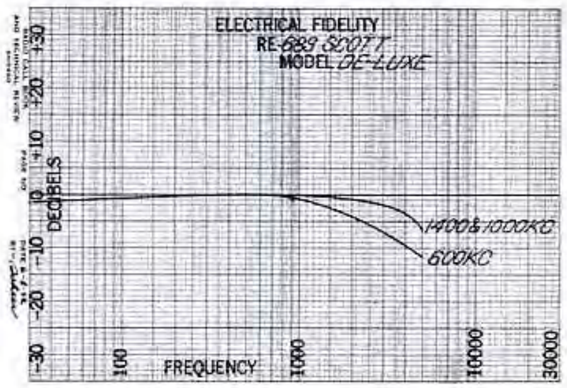
The actual performance of the receiver on the air, very decisively proves the evidence given in these curves, and shows that not only can this extreme sensitivity be used to advantage in the average location, but actually that the DELUXE is quieter in operation than most commercial receivers having a sensitivity of five or more microvolts.

This sensitivity was shown in a very interesting manner a few weeks ago while testing the DELUXE model on reception of VK2ME of Sydney, Australia against our regular ALLWAVE STANDARD model. In throwing the switch which connects the antenna to either of the two sets, it was noticed that when in the midway position, the signal of VK2ME was still coming in, although faintly. Thinking perhaps I was getting pick up from somewhere, I pulled the antenna wire plug out of the wall, leaving only about six feet of wire connected to the antenna post of the receiver. On turning up the volume control, VK2ME immediately came in with enough volume to be heard all over the house. Thinking perhaps that my body was acting as an antenna through holding the antenna wire in my hand, I hung the piece of wire on the lid of the console, and the signal was just as loud as ever. I then disconnected this six foot length of wire from the antenna post, and immediately the signal disappeared, proving quite conclusively that Sydney, Australia, over 9,500 miles distant, was being received with a pick-up obtained on only six feet of wire, I then connected the full antenna to the receiver and made a recording of VK2ME, then pulled the plug out of the wall, leaving only the six feet of wire connected, and continued recording the program. The only difference to be noted between the recording made with the regular antenna and that with the six foot length of wire, was that, as you would naturally expect, the volume was a little lower and there was more noise to the signal when using the six feet of wire.

Perfect Tone Quality

Any radio receiver that does not have a clear and pleasing tone is not worth placing in YOUR home, no matter how selective or sensitive it may be. One of the major problems we had to solve before this DELUXE model was offered to you was how to secure a combination of perfect tone quality with extreme sensitivity and selectivity. In the fidelity curve, is shown the electrical Fidelity Curve made in the measurement laboratories of the Citizen's Radio Call Book.

The difference between the tone quality of this new DELUXE model and an ordinary receiver can be clearly seen by a comparison of the fidelity shown on this page with the curves of other receivers published in the Citizen's Radio Call Book.



The electrical fidelity curve gives a graphic picture of the response of the receiver to all audio frequencies, measured from the antenna to the output to the speaker. For example, the tones on a piano go from 30 cycles on the lowest note of the scale to 4,608 cycles on the highest note.

The unit of power output used in these measurements is the Decibel. The human ear cannot detect differences in output or volume of 2 decibels or less, but when the variation of output is greater than 2 decibels, it gives undue accentuation to other notes.

When the fidelity curve shows a uniform or flat response over the entire scale of frequencies, it indicates that the reproduction is natural, and that all frequencies are getting the correct amount of emphasis. An undue increase in output at the lower frequencies, is shown by the downward degree of the curve at the low end, and causes the "boomy" effect so often noticed in ordinary radio receivers. An undue increase of output at any of the higher frequencies causes tinny, thin, or shrill reproduction, and if these resonances are of sufficient strength, might actually cause the speaker to overload or rattle.

Any severe falling off or decrease in response to any of these frequencies results in the notes being practically lost and the finer points of the reproduction are missing. A falling off of three db. indicates that the volume on these notes is only half of their original strength, and a falling off of 10 db. brings the signal down to only 1/10 of the original volume and indicates these notes are practically inaudible to the human ear. It can be seen very clearly therefore, that perfect reproduction is only secured when the electrical fidelity curve is practically flat.

An examination of the fidelity curve of the DELUXE model shows a flatter or more uniform response to all audible frequencies than any other receiver, and this fact can be easily verified by an examination of all curves that have been published in the "Receivers Performance Curve" section of the Citizen's Radio Call Book.

The curve shows that the electrical fidelity of the SCOTT ALLWAVE DELUXE is flat within plus or minus 2 db. from 30 to 3.500 cycles, and the sound pressure curve show that the overall response from the speaker is uniform up to 4.500 cycles. This means that the human ear can detect practically no difference or loss in frequency between a selection as it is actually being played in front of a microphone in a broadcasting station, and as it comes out of the speaker of a DELUXE RECEIVER.

For the first time I believe, you will listen to an orchestra and *actually* be able to pick out the individual instruments. For the first time you will hear the missing "siss" in speech. For example the "siss" at the end of "this", or the "sh" in the word "she." These are the "lost" frequencies in the ordinary radio set that are "FOUND" in the DELUXE model. It means that you not only hear music as natural as if the orchestra itself were in your room, but speech as clear cut and distinct as if the person were really in front of you.

Printed in U. S. A.

PHOTOTONE

The Witchery and Romance of Distant Lands Brought Into your Home with the Scott Allwave DeLuxe Superheterodyne

THE sonorous chimes of a bell tolling the hours comes floating in over the evening air—a pause—then a voice tells you BIG BEN in the House of Parliament in London, has just struck the hour of midnight, and wishes you a pleasant good night.

You look at your watch—it's just 6:00 p.m. in Chicago. The throb of those chimes from Old England come into your home with such power and realism, you begin to believe the age of miracles is not yet past.

Another touch of the dials and you speed through the air over ocean and land, to Sunny Italy. The hour is 2:30 p.m. in the United States—but in Rome, night has just fallen, and the evening opera will shortly commence. The microphone of Station I2RO is open in the orchestra pit—and while the musicians are waiting for their leader's signal, you hear them tuning their violins or trombones, and the hum of conversation in the audience. There comes a pause—then the strains of a great symphony orchestra and the voice of some World Famous Opera star is heard from the San Carla Theater.

Now we know—by the slight turn of a dial—the thrill that comes with flight through air and over oceans—for with the SCOTT ALLWAVE DELUXE RECEIVER you make direct connections with the broadcasting stations of Rome, London, Paris and the far East.

Roll up the carpet and dance to music direct from the Hotel Mayfair in London! Step to a Tango from the Argentina! Such reception is the easy daily accomplishment of the SCOTT ALLWAVE DELUXE.

Orchestras come in as though they were part of the room—*Your* room. The thrilling song of the violin; of the jolliest vocal melody of tenor or bass; the crooning of quartets trailing away to muted whispers—all bring their music to you through the SCOTT ALLWAVE DELUXE, as intimately as though the artist were performing only for you.

You have a totally new experience awaiting you—when you listen to programs not only in U.S.A. but from the far distant points of the earth through the peerless SCOTT ALLWAVE DELUXE.

The **E. H. SCOTT RADIO LABORATORIES, INC.**
4450 Ravenswood Ave. ***Chicago, U.S.A.***