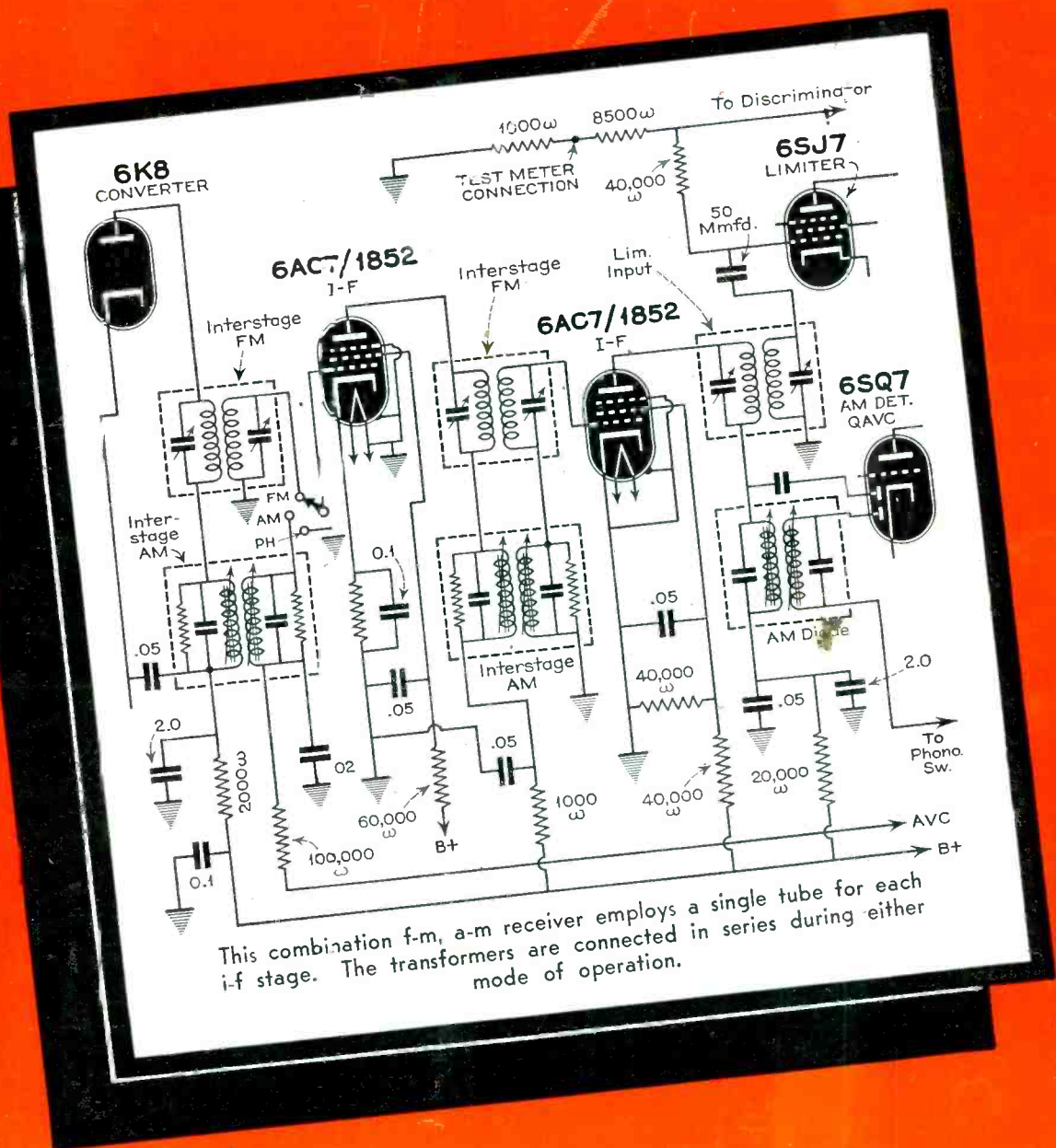


SERVICE



This combination f-m, a-m receiver employs a single tube for each i-f stage. The transformers are connected in series during either mode of operation.

JULY
1941

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MALLORY Replacement VOLUME CONTROL



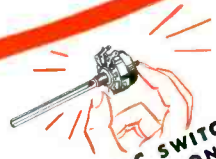
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A Monthly Digest of Radio and Allied Maintenance
Reg. U. S. Patent Office

VOLUME control shafts, old tuning condensers, shield cans, tube shields, paper and electrolytic condensers, panels, and the like, are generally made of, or contain large percentages of aluminum much needed in our defense effort. July 21 opens a nationwide collection campaign specifically designed to bring back to the smelters such discarded and unused items.

As Mr. Lewis Winner points out in his article, "National Defense and Radio", on page 3 of this issue, aluminum scrap is especially useful. In fact, over 80 per cent of the stuff collected can be employed directly in production of defense items.

The Boy Scouts of America, the American Legion and similar organizations have signified their willingness to act as collection agencies in each locality. Broadcasting stations throughout the country are giving considerable publicity to the campaign and we should all do our utmost toward making it highly successful.

We particularly urge every one of you to take an active part in the campaign. Not only should you contribute your own scrap to the last splinter (every little bit helps), but you should make a sincere effort to encourage your customers and friends to do likewise. Your technical background will lend weight to your statements as to the importance of this scrap in the entire defense effort.



THERE are many rumors going the rounds to the effect that radio receiver production has been slowing down during the last few months and is now practically at a standstill. Some of these rumors even go so far as to date this slowdown back to March. We can't account for any reason behind these false rumors, but to keep the records straight we dug up the actual figures.

From January 1 to May 1, 1941, a total of 3,768,000 receivers were sold by the manufacturers, as compared with 3,035,000 for the similar period in 1940. Excise tax payments for the month of May indicate that that month was ahead of the same period last year by approximately 16.6 per cent (in dollars).

Although we weren't able to get actual figures for June and the first half of July, we have exceptionally reliable information that this period will show production of at least 10 per cent more sets (not dollars) than the like period last year. Indications further show (although other circumstances may alter this) that there will be no serious interruption before September at least.

Perhaps the cause of the rumors was the fact that several of the factories shut down their production lines for a few days to accommodate new models. Lack of materials has caused shutdowns, of course, but until now these shutdowns have been, by and large, individual and of short duration.

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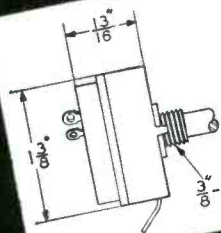
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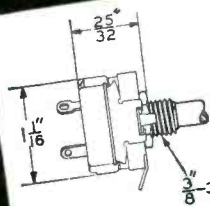
The CENTRALAB Family

of VOLUME CONTROLS



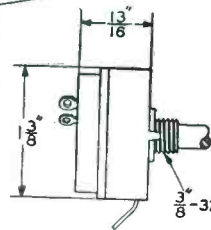
STANDARD

Long famous for the reliability of Centralab's non-rubbing contact and long wall type resistor. Available plain, or with one, two, or three taps, and with SPST, DPST, or SPDT Underwriters Approved switches.



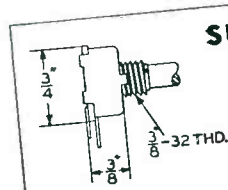
MIDGET

Small in size, but large control efficiency due to the long straight path of the wall type resistor. Fits well in crowded chassis as solder lugs do not project far beyond the control radius of 17/32". Available single, dual, or triple, plain, or tapped, with SPST, SPDT, DPST, and a special dial lite push switch for battery sets.



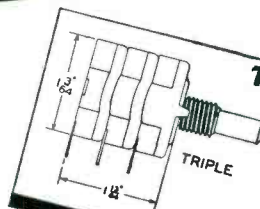
WIRE WOUND RADIOHM

Identical in size and appearance with the Standard Radiohm except has brown colored base. Resistances range from 2 ohms to 10,000 ohms. Rating 3 watts. Furnished plain or with SPST, SPDT, or DPST Underwriters Approved switches.



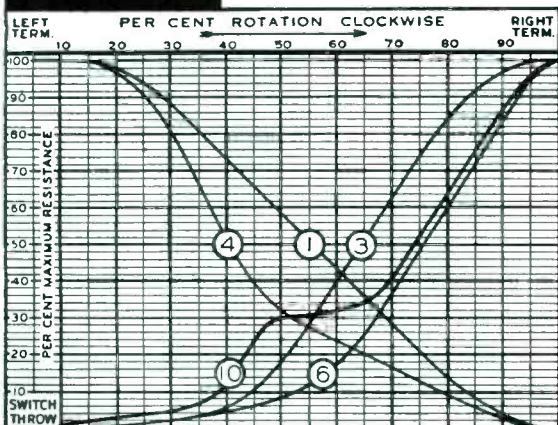
SUB-MIDGET

The smallest diameter reliable control. Long wall type resistor gives low noise level. Rapid Transfer of heat from resistor to metal shell gives maximum load rating of 1 1/2 watts. No switch or taps. Available as grounded or insulated rheostat or potentiometer with solid or tubular shaft.



TWIN AND TRIPLE CONTROLS

Two or three sections assembled in tandem for special purposes. Each section fully shielded and has independent connections. All variable controls attached to a single shaft. Twin controls also available with concentric shafts; one inside the other. Supplied with or without Underwriters Approval snap switches.



The resistor curve of a volume control is more important than its overall resistance... that is why Centralab controls are furnished with the variety of curves shown here. Curve six is most widely used for high resistance radio grid and diode controls. Curve 1, or 4, are best for C bias, and Curve 3 for antenna C bias. Curve 10 is used on tapped controls.

Centralab

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NATIONAL DEFENSE AND RADIO

By LEWIS WINNER

MARKET RESEARCH ENGINEER

A REPRESENTATIVE tour of radio parts and set-factories in the Middle West, concluded but a few days before this issue went to press, has supplied us with conclusive proof that American manufacturers more than know their business. A maze of complicated problems confronted radio engineers when priorities and OPM regulations were issued. These problems have been knocked into a veritable cocked hat. New sets and parts, already on the production line, following new defense formats of design, attest to the amazing resourcefulness of our engineers.

All-Steel Condenser

Leading the new developments is the all-steel condenser. According to engineers of several of the largest producers all of the bugs have been completely eliminated. One large manufacturer claims complete success because of the use of a new softer steel that has been a year in its development. It is interesting to note that experiments in the direction of steel began when priorities were an unknown factor, prompted then by the desire to develop materials that would be perhaps more suitable and effective. Thus, the new metals are not the result of slap-dash experiments and developments. They are, rather, the result of careful, painstaking thought and meet the demands of defense as well as the exacting needs of the industry.

The new condensers will not corrode, since they have been treated with special chemicals. This anti-rusting process assures consistent metallic properties, with resultant consistent efficiency. Tests also prove that these condensers are less subject to drift. One manufacturer ran a test, during which the temperature rose from room level to 250° Fahrenheit, and found the steel to be superior to aluminum. Innate characteristics of the new metal also eliminate microphonics.

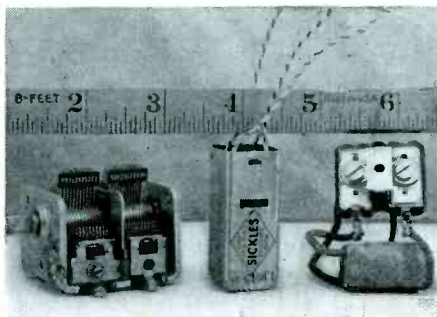
These new steel condensers will nat-



The recent ruling placing zinc on total priority may tend to bring about standardization on the number and types of batteries for portables.

urally weigh more than their aluminum predecessors. It must be remembered, however, that in most previous condensers the base was steel, and still is. As such steel constituted almost 75% of the weight of the condenser. Nevertheless, since the steel now used has about three times the weight of aluminum, there is quite an added weight with which to contend. The torque, which is now more, makes it difficult to use these condensers with mechanical tuners. Counterbalances don't help much, either, for the rotors are just that much more difficult to swing. Thus receivers using mechanical tuners will of

In addition to substitution of materials in the manufacture of radio parts, there is a definite trend toward reducing their size.



necessity have to dispense with variable condensers and use inductance tuning. Of course, there still are many manufacturers who use electrical tuning systems and will thus be able to incorporate these new condensers.

The natural elasticity of the steel plates will mean that alignment and calibration of these condensers will demand extreme caution, and perhaps more attention. Service Men should make a note of this, when next they visit one of the newer receivers.

In appearance the new condensers differ slightly from the aluminum types. In fact, many of the models being made are even smaller than the aluminum models, and thus further space economies are being effected.

Scrap Aluminum

Speaking of variable condensers and its former ally, aluminum, prompts mention of an important suggestion from officialdom in Washington concerning the scrap aluminum collection campaign. It seems as if disturbing and viciously untrue rumors, relating to the "worthless" value of the aluminum collected, have been circulating about and doing their resultant damage. The Service Man armed with his technical knowledge can be of invaluable assistance in combating the flow of this absolutely baseless information. Although the Service Man is not asked to actively participate in the collection, that being a function of the Boy Scouts of America, the American Legion and other similar organizations, he can serve his country by talking to each of his customers, either in his shop or in the home. He can spread the word around to the neighbors, and keep on hammering away.

To those technically minded, he can say that the aluminum will be classified into two types; wrought aluminumware, made from sheet aluminum, mostly of a "3S" alloy containing 1¼% manganese with some of "2S" alloy or pure commercial aluminum; and cast aluminum-

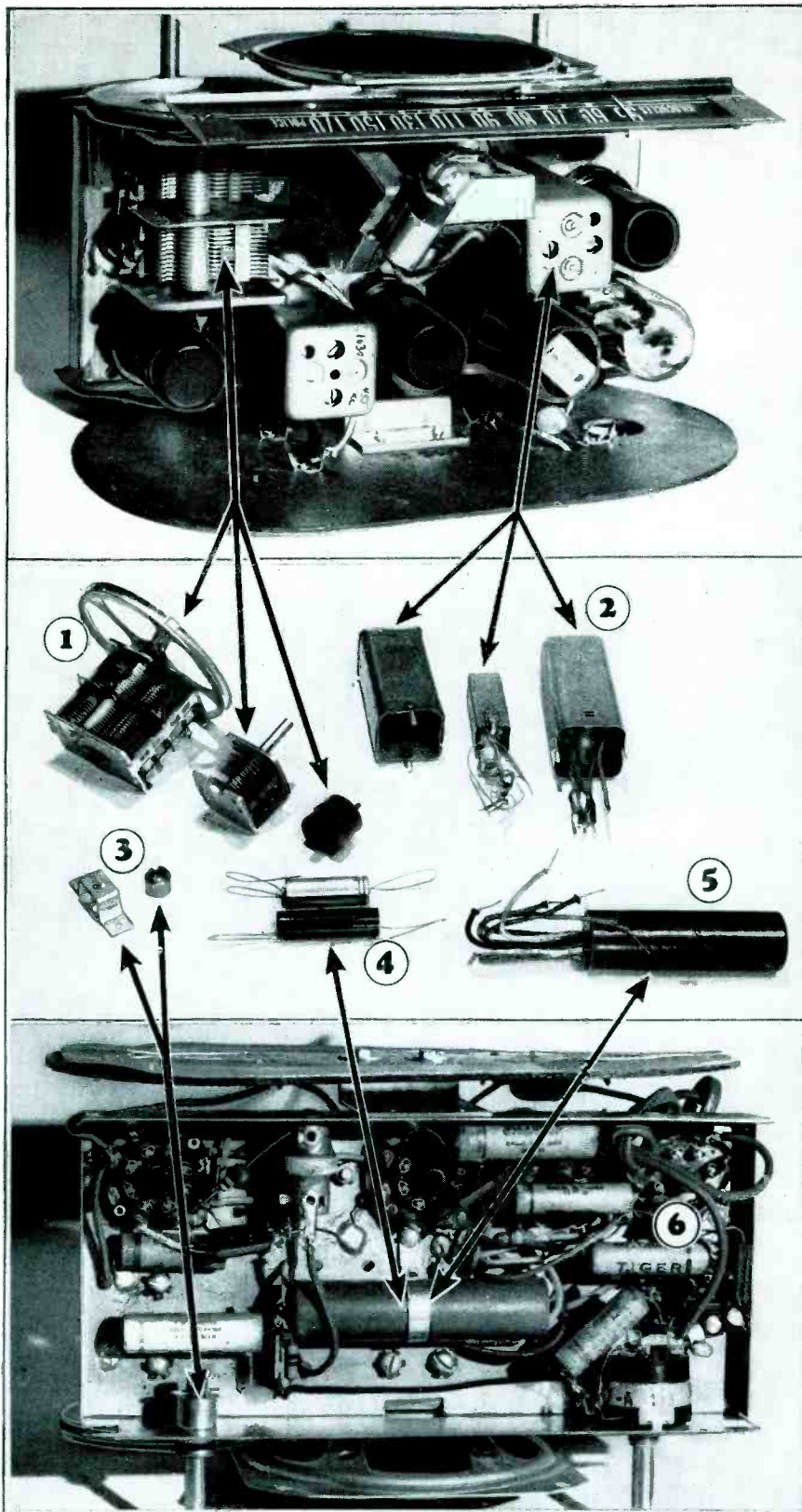


Illustration courtesy New York Daily Mirror

ware, consisting mostly of an alloy containing 5% silicon but with some other alloys occurring. At the smelters, the two types will be melted down separately, and then the metal will be analyzed to see what quality it is. According to the specialists, both in government service and private industry, the aluminum will then serve to fabricate

Substitutes occupy strategic points in receivers now in production. 1) Stators will be of steel and often rotors as well. Some manufacturers use smaller all-steel jobs with plates closer, others switching to permeability tuning. 2) Copper-lined iron and zinc (over potted coils) for aluminum shield. 3) Stampings for machined parts. 4 and 5) Plastic or kraft paper covers for aluminum for electrolytics. 6) Lead foil is being tried.

shell fuse parts, bomb fuse parts, battleship parts, tank parts, portable military equipment parts, in addition to countless important pieces in aircraft work. It is estimated that approximately 82% of the aluminum collected will have sufficient quality to serve the needs of defense. This scrap aluminum is important, and every one should not only contribute but see to it the lines of contribution go unbroken. Service Men can more than do their part in this campaign.

Fixed Condensers

Fixed capacitors are taking on many new physical and electrical forms. The dry electrolytic condensers now have either a plastic container or a kraft paper container, impregnated with wax. Dehydration problems which previously led to the selection of metal cans, have been successfully solved, so that the new types of containers are quite suitable to the purposes for which they have been designed. Paper tubular condensers will, in some instances, use lead foil instead of aluminum. While it is true that these condensers are slightly larger and heavier, since lead cannot be rolled off as fine as aluminum, they are efficient and worth the small sacrifice.

Batteries

The recent ruling placing zinc on total priority may bring the lead plate storage cell back to popularity. This ruling will also tend to standardize the number of battery sizes and types, perhaps eliminating the variety of assortments that sometimes complicate service work. The ruling seems to have a paradoxical twist, for sales will naturally be reduced, but so will eventual headaches.

Large quantities of zinc are used to produce military brass for cartridges. It can be well understood, therefore, that zinc does serve an important purpose and that as cartridge facilities are expanded the zinc problem will become correspondingly greater. Zinc is also used to line shell cases to insure complete protection from weather eccentricities.

Speakers

Most of the a-c, d-c sets coming off the line have been converted for use with electrodynamic speakers. In these conversions, a slight decrease in efficiency may be noticed, particularly in the less expensive models. The electrical efficiency of some models may be reduced as much as 3 db. Of course, in those models where cost is no object, this deficiency will be eliminated. While on the subject of speakers, it is interesting to note that crystal speaker experi-

(Continued on page 25)

CIRCUITS

See Front Cover

By HENRY HOWARD

THE Pilot Model 12 series receivers for f-m and a-m (see front cover) embody virtually two complete receivers utilizing the same audio and output system and the same r-f, converter and i-f tubes for both. Either a single or twin speakers (properly divided) may be used. The sets come in table models, consoles, or lowboy phono combinations and use 12 tubes plus a tuning eye. No a-m short-wave bands are included.

The i-f transformers for both systems are connected in series and work with the same i-f tubes. Separate detector tubes are used, however, because of the widely different detector systems required. A band switch selects the proper antenna, r-f and oscillator tun-

Fig. 2. Lafayette C125.

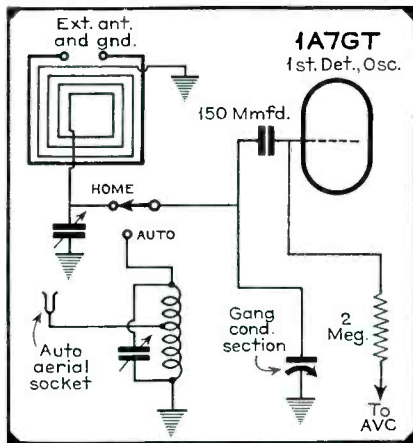


Fig. 3. Airline 14WG680.

ing circuits and switches the a-f to the proper detector, but only the first i-f secondary is switched. The intermediate

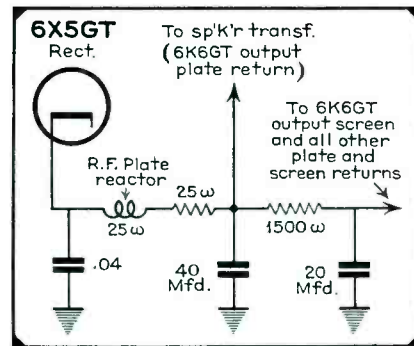
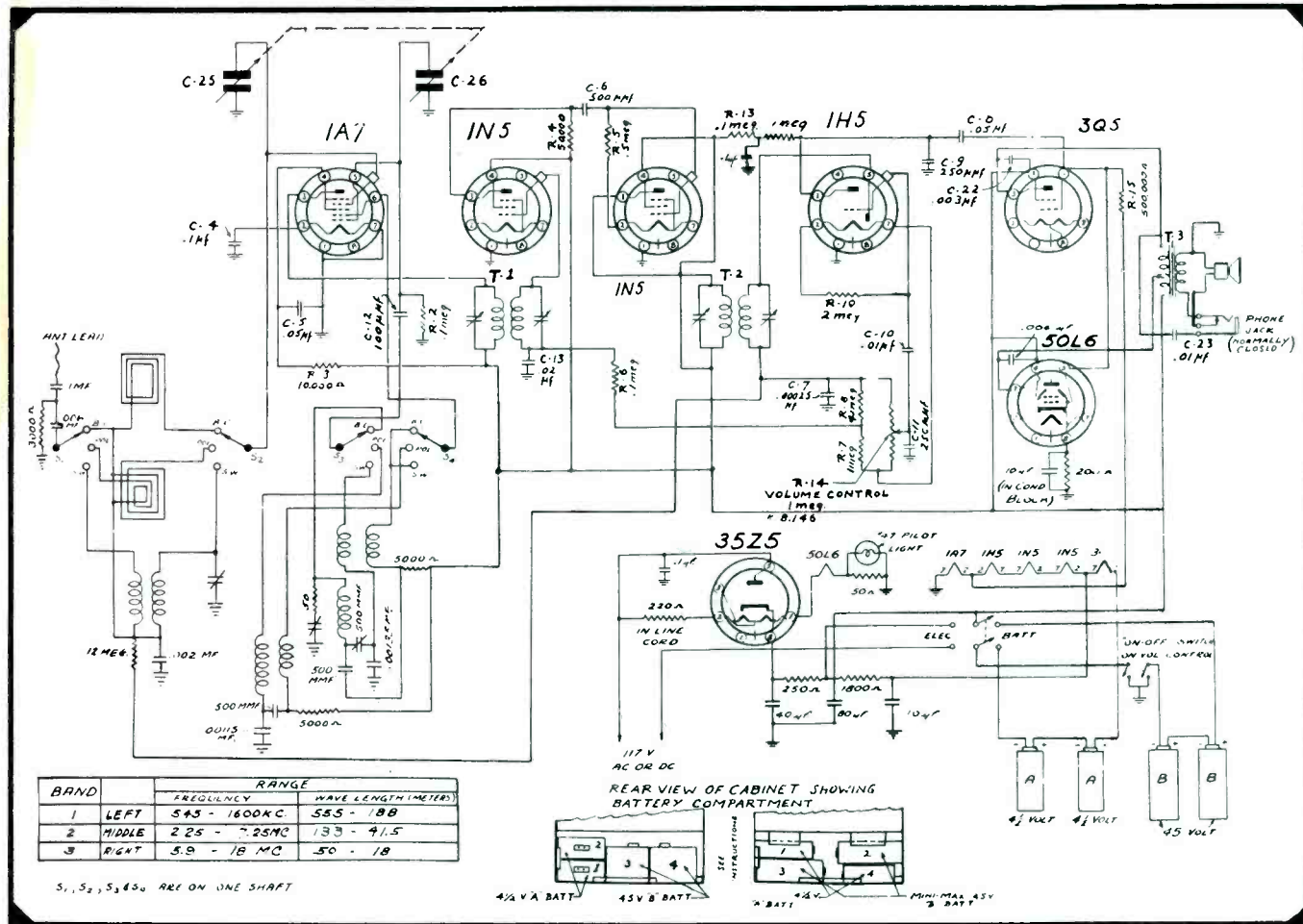


Fig. 4. Wells-Gardner 6C17 auto radio.

frequencies are so widely separated, 455 kc for a-m and 2.1 mc for f-m, that the inoperative transformers have little effect on the ones in use. More specifically, on f-m the tuning capacity of the 455-kc transformers is so great that it effectively by-passes the coil and little impedance is offered to the 2.1 mc f-m i-f signal. Conversely, on a-m the inductance of the f-m i-f transformer winding is so low that little drop takes place in the 455-kc a-m i-f voltage.

Other features include a squelch tube (qavc) for interstation noise; inverted feedback from voice coil to first a-f cathode; tone control in the degenerative circuit, providing sharper cut-off; and a balanced detector for accurate resonance indication on the tuning indica-



Model	Acme	Advance	Bond	Bright Star	Burgess	Eveready	Gen-eral	National Union	Philco	Rayo-vac	Usalite	Wil-lard	Win-chester	
TRANSITONE (See Philco)				TRAVEL MATE (See Packard Bell)										
TROY (Troy Radio & Television Co.)														
940, 949.....	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
951, 953.....	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
952.....	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
BP140.....	1AB	460-15	411	...	...	5DA60	...	60A2L	...	...	...	AB665	...	...
BP550.....	1A	118FM	547	4823	865	8FL	745	8CF1	...	...	P98L	645	...	4813
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
BP640.....	1A	116	...	4824	660	6F	743	6F1	A831	P96	P96A	637	6F1	4814
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
TRUETONE (See Western Auto Stores)				WESTERN AIR PATROL (See Wells-Gardner)										
WARWICK (Warwick Manufacturing Co.)														
0-407, 0-411, Craft,	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
Crane, 40, 945.....	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
0-461, 0-464.....	1A	118FM	547	4823	865	8FL	745	8CF1	...	...	P98L	645	...	4813
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
0-501, A-C, D-C.....	1A	118S	817	...	866	2F4	718	8F4	A834	...	P698A	638	8F4	4817
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
0-531, 0-532, 0-533,	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
0-534, 0-535, 0-539, 0-558.	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
9-457, 948, Clark.....	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
532, 536, 1-531.														
1-533, 1-541, 1-543.....	1AB	...	...	...	...	...	...	60A4FL4	...	P60A4FL4	AB694	AB674	...	...
WATTERSON (Watterson Radio Manufacturing Co.)														
415.....	1AB	460-15	411	...	...	5DA60	...	60A2L	...	...	...	AB665	...	...
PB.....	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
WELLS-GARDNER (Wells-Gardner & Co.) (All numbers cover entire series)														
4B5, 5B3, 5B8, 5B9....	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
4B11.....	1A	123M	447	...	465	4FL	...	3L1	...	...	P94L	642	...	...
	2B	430	...	...	30-55	A30	738	V30A	...	...	430P	621	V30A	...
4B19, 5B20.....	1AB	...	...	...	...	...	...	39AAA1L	...	P89	...	...	...	...
5B12.....	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	430	...	...	30-55	A30	738	V30A	...	...	430P	621	V30A	...
6B7, 6B10, 6B16, 6B18.	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	430B	6218
WESTERN AUTO (Western Auto Stores)				(All model numbers include entire series)										
D937, D938.....	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
D939.....	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	430	...	...	30-55	A30	...	V30A	...	...	430P	621	V30A	...
D940.....	1A	...	...	...	561	G5	...	5H5	...	...	P85A	687	...	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
D1080, D1182.....	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	430	...	...	30-55	A30	...	V30A	...	...	430P	621	V30A	...
WESTINGHOUSE (Westinghouse Electric Supply Co.)														
WR166, WR674,	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
RC410A.....	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
WR675, WR675A,	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
RC433.....	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
WR676, WR678,	1A	118S6	747	4825	868	2F4L	747	8CF4	...	...	P698L	646	...	4815
WR679, RC455A.....	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
WR62K1, WR62K2,	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
WR680.....	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
WILCOX-GAY (Wilcox-Gay Corp.)														
A73.....	1A	...	2476	...	646	F4P1	747	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	482	V30B	B860	P305	P5303	624	V30B	6218
WINDSOR (See Wells-Gardner)				WOR (See Wells-Gardner)										
WINGS (Goodyear Service Stores)														
	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
ZENITH (Zenith Radio Corp.) (All model numbers include entire series)														
4K400, 5416.....	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
4K402.....	1AB	860-41	...	...	...	4FA60	...	...	...	...	...	...	...	...
4K600.....	2A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
5G401, 5G403, 5G405..	1AB	...	...	...	...	F4B60	...	...	...	...	...	...	...	...
5G500, 5G501.....	1AB	...	...	...	...	G4B50	...	Z50B4H4	...	...	...	AB670	...	...
ZEPHYR (Zephyr Radio Co.)														
25G5.....	2A	...	...	...	...	0	...	...	...	...	...	...	...	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
34J5.....	1AB	...	...	...	...	6FA60	...	60A46	N803	P60A4L	AB84	AB667	...	...
578, 583, 585, 592	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218

DOLLAR COOPERATION

By FREDERIC HILLEGAS



Cooperation with broadcast station WFBL, Syracuse, New York, has proved profitable to Pat Cerone, local radio Service Man, not only from an actual cash standpoint but much more from the standpoint of lasting prestige. He doesn't have to solicit business, he is usually begged to take it.

HERE is a new angle on radio servicing that has proved a money maker and good-will builder. The original idea was from a Syracuse, New York, radio broadcast station, but there is no reason why any Service Man couldn't broach it to the broadcaster.

Station WFBL was finding that a good many persons (an average, say, of two a day) were telephoning complaints about reception. Radio engineer Bob Aller cooked up the idea and presented it to station officials. They, in turn, went to Pat Cerone, radio service shop owner in Syracuse, with the proposition of calling on the complainants and placating them.

Cerone does just that and, from all reports, is doing a good job of it. The iron-clad rule is that Cerone is working for the station on these calls, and not for himself. Therefore, he doesn't actually solicit any work for himself; however, since he does this diagnosis and,

in some cases, simple treatment, for the listener, there can be no doubt that it is a great advertisement for which he actually is getting paid!

Another part of the agreement is that Pat gets a flat rate for each call.

When a complaint on reception is received by the WFBL switchboard operator, she turns it over to the engineer. He, in turn, makes an original typewritten report and two carbon copies—giving the name and address and telephone number of the complainant and the specific grievance. The original goes into a looseleaf notebook. Both carbons go to Cerone.

Cerone makes the call. If the complaint is occasioned merely by a slight trouble that can be easily remedied, he does the job right away and notes it on his report. In many, many cases, poor reception has been caused merely by inadequate tuning on the part of the listener. When this is the case, Cerone merely delivers a tactful lesson on the fundamentals of proper tuning. Often the areal is at fault, or an appliance radiating static, or a ground wire loose. If the radio set is antiquated, Cerone makes this plain, without, however, putting in a plug for himself. In any event, he makes some authoritative suggestion.

After his visit, Cerone sends one carbon copy back to WFBL, so that from his description of what he found and what he did they can complete their own original in the loose-leaf book and keep that case record up-to-date. The second carbon, Pat fills out similarly and keeps, so that he can present it to WFBL's front office as a voucher for payment as per the agreement.

As a check-up, an engineer from WFBL generally telephones the listener a few days later. This provides one more testimony for the listeners that WFBL is highly interested that they get good radio reception.

Results of the program have been definite and encouraging. WFBL has often received calls from the listeners so served, attesting that they are happy and satisfied.

"There is no doubt," it has been said, "that a listener once so helped out is on WFBL's side. He knows the station has an interest in him. He undoubtedly perks up his ears every time he hears WFBL mentioned after that."

The station gives a good deal of credit for the success to Pat. He provides listeners with sympathetic service; he doesn't try to high-pressure his wares; he has been reasonable about doing many small, incidental services that are not in the agreement and for which he has charged neither the station nor the listener.

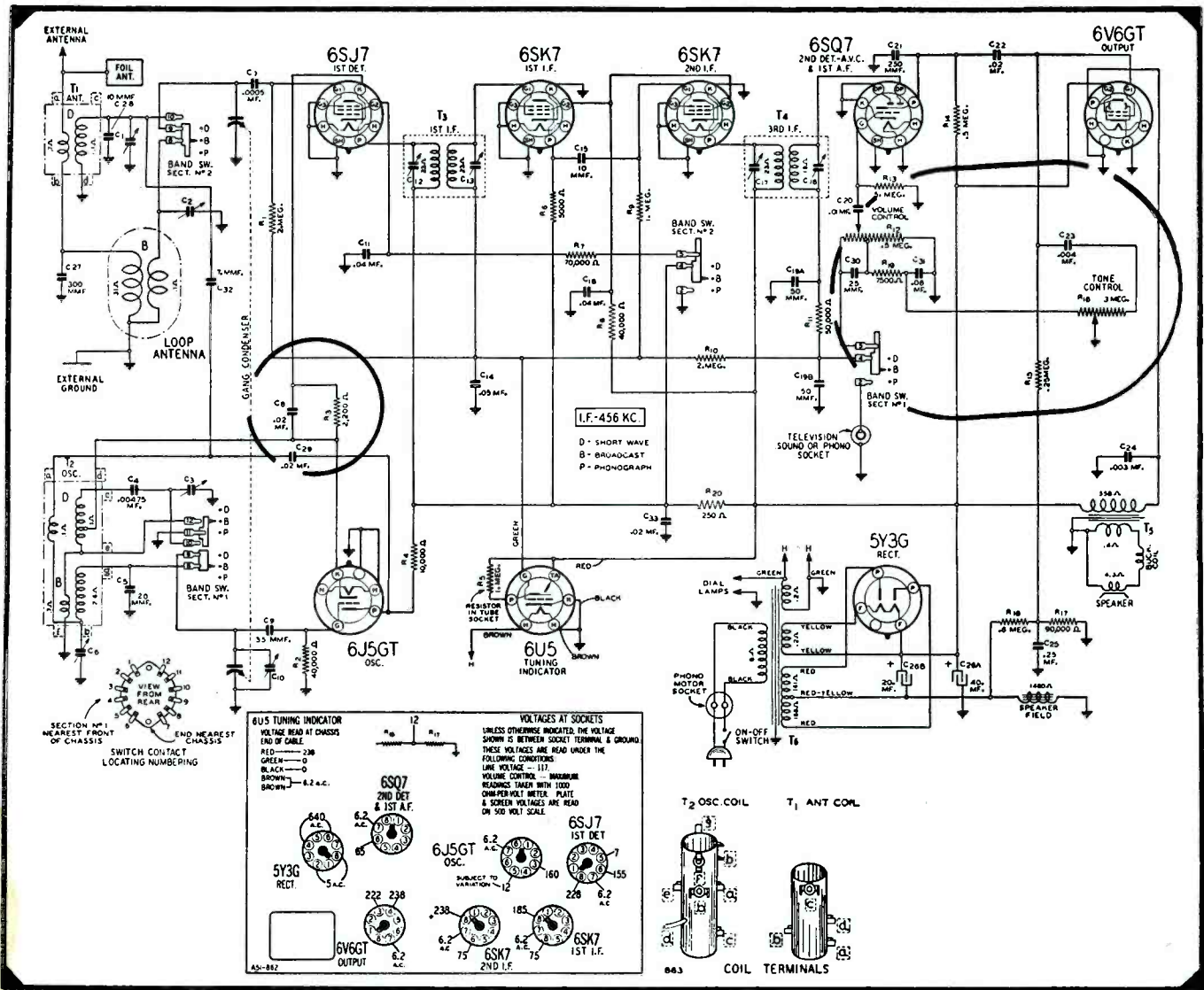


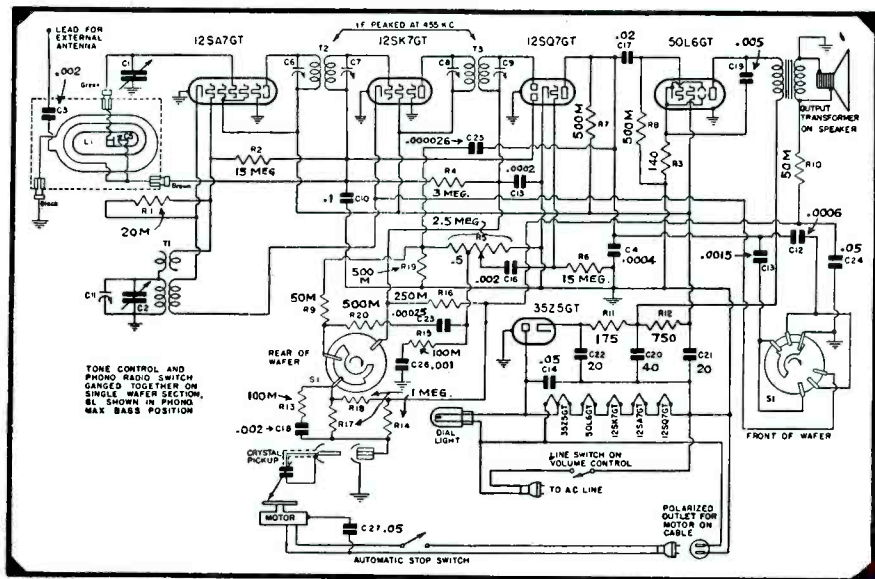
Fig. 6. Wells-Gardner 8A51.

volt battery employed for B power.

Automatic Tom Thumb

Another 3-in-1 personal portable is the 4-tube Tom Thumb made by Automatic Radio. Instead of the usual 1S5

Fig. 7. Emerson FJ412.



and 1S4 detector-a-f and power tubes, this set uses the 1D8GT, which combines these functions. (See Fig. 1.) An advantage is the saving in filament power, the two tubes take a total of 150 ma while the combination tube draws only 100. No resistance line cord is necessary since the rectifier (117Z6)

(Continued on page 17)

output as high as the peak value of the a-c input. Because of the high charging current of the first filter condenser on a-c, there is a considerable IR drop in the 80-ohm line cord resistance while on d-c operation the drop remains low because of the absence of the charging current.

Having an r-f stage, the set has a high gain suitable for operation at maximum output in most localities. However, for operation under difficult conditions, such as in a car, bus, train or airplane, an especially designed external window antenna is available. This antenna is simply plugged into the right side of the receiver by means of two pins and can be held in position on the window by suspending it from a suction cup. The plugging-in operation automatically disconnects the internal loop and connects the external device across the variable tuning condenser. The filaments are connected in series on line operation and in parallel on batteries. A fairly complicated system of switching is used to change over. Three standard D size A cells, connected in parallel, are used for filament power. This combination will give approximately half the life of the regular 67½-

REPLACEMENT BATTERIES FOR PORTABLES

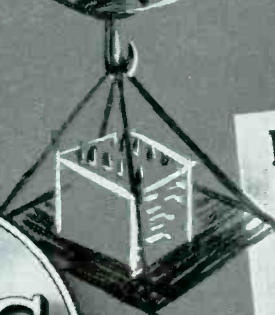
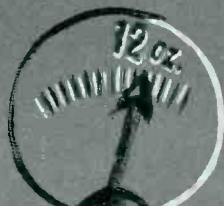
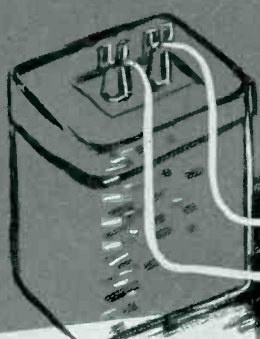
(Continued from June)

Model	Acme	Advance	Bond	Bright Star	Burgess	Eveready	Gen-eral	National Union	Philco	Rayo-Vac	Usalite	Wil-lard	Win-chester	
MEISSNER KIT (Meissner Mfg. Co., Inc.)														
10-1187	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
10-1189, 10-1190,	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
12-1031	2B	...	...	...	30-50	A30M	...	...	...	...	...	...	...	...
MIDWEST (Mid-West Radio Corp.)														
P5	1A	114S	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
MISSION BELL (Mission Bell Radio Mfg. Co.)														
400, 503	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
500, 501	1A	...	...	...	86	44	7111	...	...	6	6	...	6	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
502	1A	118FM	547	4823	865	8FL	745	8CF1	...	...	P98L	645	...	4813
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
504	1A	114S	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
507	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	830	284	6220	30-03	B30	482	W30B	B861	...	P5S30	640	...	6210
508	5A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
MONROE (See Wells Gardner)														
MONTGOMERY WARD (Montgomery Ward)														
403, 454, 1455, 555,	1A	...	...	...	...	...	...	4L1	...	...	...	...	4L1	...
2555, (15B3)	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
407, 461, 1461, 464,	1A	123M	447	...	465	4FL	...	3L1	...	...	P94L	642	3L1	...
1464, (14B11)	2B	430	...	...	30-55	A30	738	V30A	...	...	430P	621	V30A	...
565, 1565, 2565, (15B8)	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
566, 2566, 569, 2569,	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
(15B12)	2B	430	...	...	30-55	A30	738	V30A	...	...	430P	621	V30A	...
663, 668, 2663, 2668,	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
(16B7), 672, 2672,	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
(16B10)	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
680, 1680, 2680,	1AB	...	...	...	...	...	...	60B6H6	...	...	...	...	...	...
(6B16)	1AB	...	...	...	...	...	...	60B6H6	...	...	...	...	...	...
MOTOROLA (Galvin Manufacturing Corp.)														
41D, 41D1, 41D2, 51D,	1A	116	...	4824	660	6F	743	6F1	A831	P96	P96A	637	6F1	4814
51D1, 51D2, 52D, 52D1,	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
41H	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
41S (Sporter)	1A	...	...	...	...	2F	...	2F1	...	...	...	...	2F1	...
	1B	...	...	...	...	W20P1	...	V20AAAG	...	...	...	...	...	...
	1B	...	...	...	...	W34	...	V34AAAG	...	...	...	...	...	...
57BP, 57BP1, -BP2,	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
-BP4, 65BP, 65BP1,	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
-BP2, -BP3, -BP4,	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
3A5	5A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
A1	2A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
MUSIC-AIRE														
590-1A	1A	118S	817	4827	866	2F4	718	8F4	A834	...	P698A	638	8F4	4817
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
NAMCO (Hamilton Radio Corp.)														
D110, D111, D112	1A	118S6	747	4825	868	2F4L	747	8CF4	...	...	P698L	646	...	4815
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
OLYMPIC (Hamilton Radio Corp.)														
PQ61	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
PT50, PT51	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
PACKARD BELL (Packard Bell Co.)														
40	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
40A, 40B	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
41	1AB	...	...	...	...	6TA60	...	...	...	...	...	...	...	...
54, 56A, 57A	1AB	460-15MS	...	...	...	2GA60	...	...	...	...	...	...	...	...
56, 57	1A	118FM	547	4823	865	8FL	745	8CF1	...	...	P98L	645	...	4813
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
PHILCO (Philco Radio & Television Corp.)														
39-71T, 39-72T, 39-73T,	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
39-74T, 39-504T,	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
40-74T, 40-504T,	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
40-81T, 40-82T,	1AB	442-4	41AD7	...	...	4GA42	...	41A4FL	...	P41A4FL	AB419	AB669	...	...
40-83T, PT63,	1AB	...	...	...	...	...	...	...	...	P60A110	...	...	...	...
40-84T	1AB	...	...	...	...	...	...	...	...	P60A4L	AB84	AB667	...	...
40-88T	1AB	...	...	...	...	6FA60	...	60A4L	...	P41A4G	...	AB672	...	...
41-81T, 41-83T	1AB	...	...	...	...	...	...	...	...	P60A8F4	AB673	...	...	...
41-84T, 41-85T	1AB	...	...	...	...	...	...	...	...	P89	...	...	...	...
PT87, PT88, PT89	1AB	...	...	...	...	...	...	...	...	P841	...	...	...	...
41-841, 41-851	1AB	...	...	...	...	...	...	...	...	...	...	...	...	...
41-842T, 41-843T,	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
41-844T, 41-853T,	2B	830	284	6220	30-33	M30	482	W30B	B861	P200	P5S30	640	...	6210
41-854T	2B	830	284	6220	30-33	M30	482	W30B	B861	P200	P5S30	640	...	6210
PIERCE-AIRO (See De Wald)														
PLYMOUTH (See Wells-Gardner)														

Model	Acme	Advance	Bond	Bright Star	Burgess	Eveready	Gen-eral	National Union	Philco	Rayo-Vac	Usalite	Wil-lard	Win-chester	
PILOT (Pilot Radio Corp.)														
TH11, TH12.....	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
T71	1A	118S6	647	4825	868	2F4L	747	8CF4	...	...	P698L	646	...	4815
	2B	830	284	...	30-33	M30	482	...	B861	...	P5S30	640	...	...
T186, T187.....	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
T1021	1A	...	...	...	461	...	...	...	...	...	...	...	...	...
	2B	...	...	...	30-50	Z30	738	V30AA	...	...	P7R30	...	V30AA	...
T1351	1A	...	...	...	661	...	...	...	...	...	...	...	...	...
	2B	...	...	...	30-50	A30M	...	...	...	...	...	...	...	...
T1451, T1452.....	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
X1451, X1452, X1453.....	1A	118S	817	4827	866	2F4	718	8F4	A834	...	P698A	638	8F4	4817
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
PORT-O-MATIC (Port-O-Matic Corp.)														
BE27 Series.....	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
U17A, U17C, USW17, USW17A, USW17C.....	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
	1C	...	...	...	...	5540	773	...	...	P5B	...	...	...	...
PORT-O-RADIO (Ansley Radio Laboratories)														
M1	1AB	...	...	...	...	6TA60	...	...	...	...	...	...	...	...
RADIETTE (See Wells-Gardner)														
RCA VICTOR (RCA Manufacturing Co., Inc.)														
15BP Series, 25BP, P5, RC465, RC527, RC527A	1A	116	...	4824	660	6F	743	6F1	A831	P96	P96A	637	6F1	4814
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
94BP1, 94BP61, 94BP62, 94BP64, 94BP66, 94BP80, 94BP81, (RC407)	1A	118FM	547	4823	865	8FL	745	8CF1	...	...	P98L	645	...	4813
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
94BP4 (RC410)	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
AVR102	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
BP10	1A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
BP55, BP56, BP85, RC455	1A	118S6	747	4825	868	2F4L	747	8CF4	...	...	P698L	646	...	4815
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
RADIO PRODUCTS														
4D	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
RADOLEK (The Radolek Co.)														
17679, 17680	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
17681	4A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
REMLER (Remler Co., Ltd.)														
92	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
93	1AB	460-15MS	411	...	...	6TA60	...	60A2L	...	P41A4FL	...	AB665	...	...
94	1AB	460-15	411	...	...	5DA60	...	60A2L	...	...	...	AB665	...	...
95	1AB	860-41	411	...	...	5DA60	...	60A2L	...	...	...	AB665	...	...
440	4A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
RME (Radio Manufacturing Engineers, Inc.)														
ME14	1A	...	...	...	...	2FBP	...	...	...	...	...	...	...	...
	2B	...	...	...	...	Z30N	...	...	...	...	...	...	...	...
ST. REGIS														
263	1A	118	147	4829	860	8F	741	8F1	A833	96A	P96A	635	8F1	4819
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
403	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
SEA PAL (Sea Pal Radio Co.)														
6P21	1A	...	...	...	561	G5	...	5H5	...	...	P85A	687	...	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
SEARS ROEBUCK (See Silvertone)														
SENTINEL (Sentinel Radio Corp.)														
127BL, 151BL	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
160BL, 170BL	1AB	...	...	...	...	4TA60	...	...	...	...	...	...	...	...
172BL, 202BL, 205BL	1A	118FM	547	4823	865	8FL	745	8CF1	...	...	P98L	645	...	4813
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
178BL, RC181BL	1A	116	...	4824	660	6F	743	6F1	A831	P96	P96A	637	6F1	4814
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
180XL (Early)	1A	...	2476	...	646	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
180XL (Late), 201XL	1A	118S	817	4827	866	2F4	718	8F4	A834	...	P698A	638	8F4	4817
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
192XL, 213P	1A	118S6	747	4825	868	2F4L	747	8CF4	...	...	P698L	646	...	4815
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
217P, 219P, 228P, 231P, 262P	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
227P, 247P	2A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...

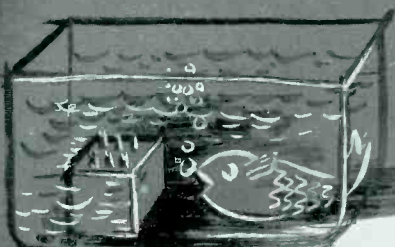
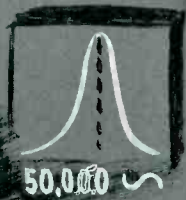
Model	Acme	Advance	Bond	Bright Star	Burgess	Eveready	Gen-eral	National Union	Philco	Rayo-Vac	Usalite	Willard	Win-chester	
SETCHELL-CARLSON (Setchell-Carlson, Inc.)														
55	4A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
66 (no B Bat.)	5A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
SKY CHIEF (Sky Chief Radio Corp.)														
A212, A213, 216	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
215, 218	1A	118	147	4829	860	8F	741	8F1	A833	P305	P5303	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
217, 221	1A	115S	...	...	30-03	B30	762	V30B	B860	P305	P5303	633	...	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
219	1A	114S3	...	...	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
222	1A	123M	...	465	30-03	4FL	...	...	...	...	P94L	642	...	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
225	1AB	460-15S	...	...	...	D5A60	...	60A5D5	...	...	...	...	...	...
226	1A	115S	...	...	30-33	M30	482	V30B	B861	...	P5S30	640	...	6210
	2B	830	284	6220	30-33	M30	482	V30B	B861	...	P5S30	640	...	6210
SILVERTONE (Sears, Roebuck & Co.)														
6256, 6266, 6273, 6274	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
6372, 6541	2B	330	267	3017	30-03	4FL	...	F4	...	...	...	643	...	...
6551, 6751	1A	...	...	...	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
6561, 6661, 6721, 6761	2A	123	647	4928	361	G3	746	3H3	...	P100	P83A	683	3H3	4919
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
6641	2A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	XX45	467	W45A	...	...	...	...	...	...
6651	1A	116	...	4824	660	6F	743	6F1	A831	P96	P96A	637	6F1	4814
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
6911, 6951, 7814	1A	...	2476	...	...	F4PI	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
SKY HAWK														
3910	1A	116	...	4824	660	6F	743	6F1	A831	P96	P96A	637	6F1	4814
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
SOLTER														
	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
SONORA (Sonora Radio & Television Corp.)														
400, 805	6A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
KB73, KD75, LR147	1A	118S6	747	4825	868	2F4L	747	8CF4	...	...	P6986	646	...	4815
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
KG80 (Candid), KG132	3A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	1B	...	...	...	...	Z30	738	V30AA	...	...	P7R30	...	V30AA	...
PL29, PL37	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
XL28, XL29	1AB	460-15	411	...	...	5DA60	...	60A2L	...	...	AB665	...	...	...
SOUNDVIEW MARINE (Karns-White Corp.)														
400, 510, 805	6A	111	2	102	10M	2	950	D	D	D	2	1094	D	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
SPARTON (Sparks-Withington Co.)														
411-1	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
549-1	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
590-1, 590-1C	1A	118S	817	4827	866	2F4	718	8F4	A834	...	P698A	638	8F4	4817
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
591-1	1A	...	2476	...	...	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
STEWART WARNER (Stewart-Warner Corp.)														
02-4A Series, 05-5X, (02-4A1 to 02-4A9)	1A	116	...	4824	660	6F	743	6F1	A831	P96	P96A	637	6F1	4814
	2B	...	...	...	...	...	727	F30A	...	...	BB30P	...	...	...
02-41 Series, (02-411 to 02-419)	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	A860	P305	P5303	624	V30B	6218
05-5L Series (05-5L1 to 05-5L9), 15-5Y, 15-5Y1	1A	118FM	547	4823	865	8FL	745	8CF1	...	...	P98L	645	...	4813
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
15-5X1	1A	118S6	747	4825	868	2F4L	747	8CF4	...	...	P698L	646	...	4815
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
STROMBERG-CARLSON (Stromberg-Carlson Telephone Manufacturing Co.)														
402H, P30990	1A	118	147	4829	860	8F	741	8F1	A833	P96	P96A	635	8F1	4819
	2B	830	284	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
SUPERMACY R. H. Macy & Co. (See Wells-Gardner & Garod)														
SYMPHONY (See Wells-Gardner)														
TELEX (Telex Radio & Television Co.)														
P5	1A	118S6	747	4825	868	2F4L	747	8CF4	...	...	P698L	646	...	4815
	2B	830	287	6220	30-33	M30	482	W30B	B861	...	P5S30	640	...	6210
TEMPOTONE (Barker Bros.)														
93	1AB	460-15	411	...	...	5DA60	...	60A2L	...	...	AB665	...	...	...
TRAV-LER (Trav-ler Radio & Television Co.)														
553, 554, 1555, (Also B and BT Nos.)	1A	114	247	4826	462	4F	742	4F1	A830	P94	P94A	634	4F1	4816
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
556, 1556, B71, (Also B and BT Nos.)	1A	118S	817	4827	866	2F4	718	8F4	A834	...	P698A	638	8F4	4817
	2B	330	267	3017	30-03	B30	762	V30B	B860	P305	P5303	624	V30B	6218
B70	1A	...	2476	...	...	F4P1	...	4F4	...	...	P694A	639	4F4	...
	2B	430	...	...	30-55	A30	738	V30A	...	...	430P	621	V30A	...

BELIEVE IT OR NOT



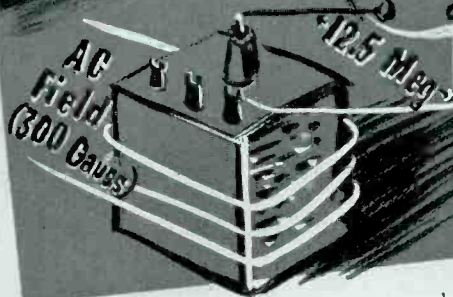
One of the greatest difficulties in producing high Q coils of compact construction lies in the variation of inductance with applied voltage. Considerable research at UTC has licked this problem. A good example is a solution to one customer's problem on a 1.5 Hy. coil having a Q of 85 at 2,000 cycles. While this coil weighs only four ounces, the change of inductance from 0 to 100 applied volts is only $\frac{1}{4}$ of 1%.

Light weight is one of the greatest problems in aircraft equipment. A typical UTC development along this line is an aircraft unit consisting of four complete band pass filters with a total weight of only 12 ounces.



One of the greatest problems in high Q coils is that of obtaining high inductance at high frequencies. The nature of one customer's application, however, led UTC to the development of a 1 Hy. coil having such low distributed capacity that the natural resonance frequency is 50 Kc. The Q at 10 Kc. is 150.

Few people realize the degree of safety factor in some submersion type transformers. One UTC test specification reads: The unit is submerged under hot salt water at 65 degrees C. This is followed by a submersion under cold salt water at zero degrees C. Following this it is submerged at room temperature for twenty-four hours. This cycle is completed five times. At the end of the week, the unit is cleaned off and the insulation resistance between windings must exceed one billion ohms.



High gain transformers with low hum pickup are a difficult problem. UTC developed a unit for one customer's application which is phenomenal in this respect. The transformer developed has a 500:1 ratio with a 50 ohm primary (secondary impedance 12,500,000 ohms). With this tremendous ratio and a rather compact structure, the hum pickup in a field of 300 gauss is limited to -126 DB.

UNITED TRANSFORMER CORP.

150 VARICK STREET



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

COMMUNICATIONS RECEIVER

HALLICRAFTERS SX28

By Holmes Webster

THE R-F amplifier, or pre-selector, of the Hallicrafters Model SX28 Super Skyrider, has 1-6AB7 and 1-6SK7 tube in cascade on bands 3, 4, 5, and 6. On bands 1 and 2 more than one stage is unnecessary to obtain the required image ratio and reduction of spurious interference to accomplish satisfactory image rejection.

The Model SX28 has an image ratio of 45 to 1 at 28 mc, 350 to 1 at 14 mc, and a proportionately increasing ratio as the frequency is lowered. While the two r-f stages are principally needed to obtain such image ratios they also perform two other useful functions: more favorable signal to noise ratio, and slightly increased selectivity.

The coil assembly is rigidly constructed and each section is completely shielded from the other. On bands 3, 4, 5, and 6 the r-f and antenna coil is permeability tuned. On bands 1 and 2 the inductance of the antenna coils is sufficiently large so that lead length dif-

ferences do not cause any noticeable inductance change.

Oscillator and Converter

A separate 6SA7 tube is used as the high frequency oscillator. The h-f oscillator is coupled to the 6SA7 converter tube at the cathode tap. A 6SA7 tube is used in the mixer circuit. Negative loading is applied to the tuned circuit feeding its control grid.

I-F Amplifier

The first two i-f transformers are permeability tuned. The diode transformer is air-tuned with two variable condensers each with a lump capacity of 50 mmfd and variable of 50 mmfd. These air trimmers are under spring

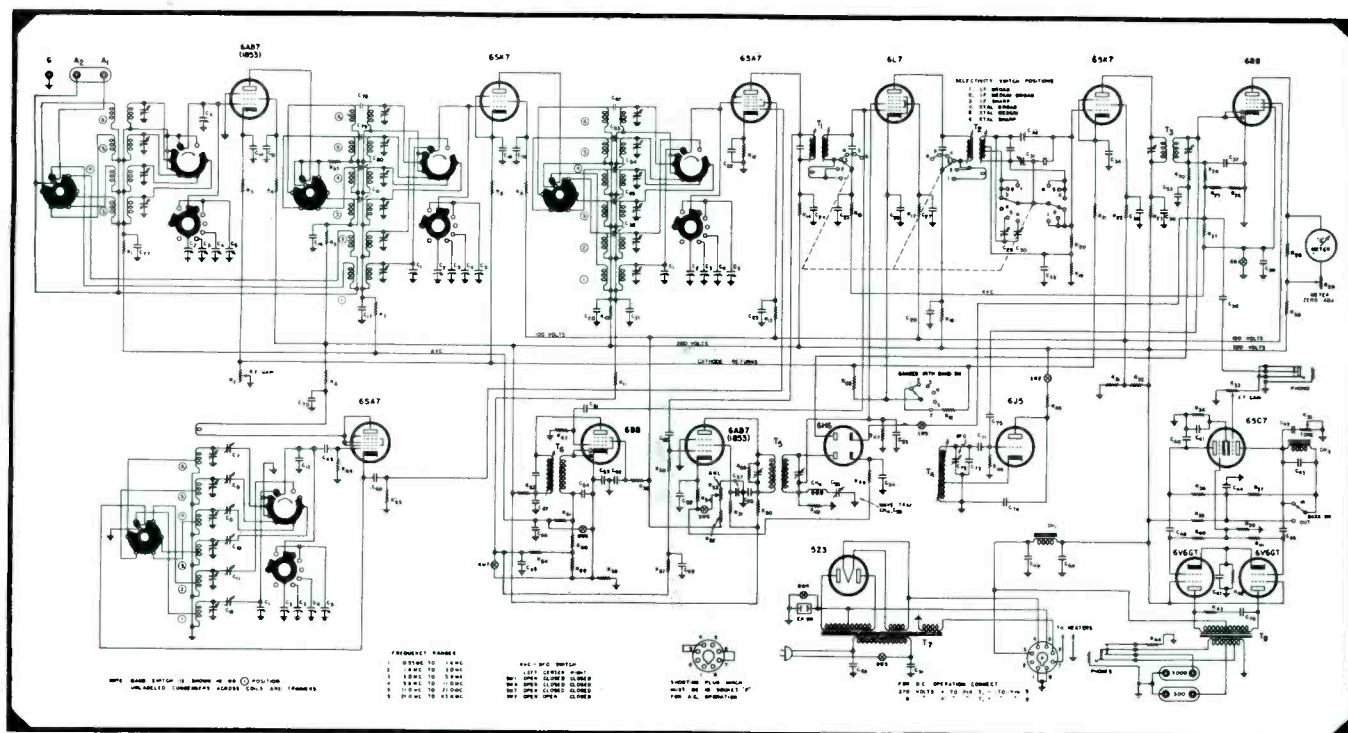
tension so that they can withstand considerable vibration. The i-f transformers are expanded in two steps, enabling medium or full reproduction of the higher frequencies.

Variable Selectivity

Six ranges of selectivity are provided from broad to crystal sharp. In positions 1, 2, 3 the crystal is short circuited. In position 4 the short across the crystal is opened and the iron core in the secondary of the transformer is adjusted for broad crystal action and at this point is accurately tuned to the crystal frequency. Due to the close coupling of the secondary to the crystal, the sharply rising resonance curve of the crystal causes, in contrast, a sharply falling resonance curve in the secondary. The combined action of these two characteristics results in a relatively broad resonance curve for the Crystal Broad selectivity setting. In the Medium Crystal No. 5 position, C₂₀ is adjusted for selectivity midway between

(Continued on page 16)

The Hallicrafters Model SX28 is a deluxe type communications receiver with many special features not found on sets designed for the home. These features include: Variable selectivity, noise limiter, amplified avc and beat frequency oscillator.



Associations . . .

Boston, RSA

With the return of Director Ray Wyman from Chicago the Boston Chapter has had pow-wows and started on another busy campaign. Enlargement of the chapter, both in membership and in territory served, has been under consideration for some time and now goes into effect.

Hy Leve, Secretary.

Chicago, RSA

Chicago, RSA, looks forward to a new series of meetings—Jobber House-Parties. It'll mean a real shindig every time, being held directly on the jobbers' premises. Refreshments and all are promised. This may be just what the doctor ordered to counteract the drop in activities usually experienced during this time of the year—we hope.

Our Annual Picnic—Sunday, July 13. Present prospects are that it will be the biggest ever. *Al Kilian, Secretary.*

Danville, RSA

Thirteen members of the Danville, Ill., Chapter left Danville Friday, June 13, at 4:30 A. M., headed for the RSA Convention and the Radio Trade Show in Chicago. As each one entered the station, it was quite evident that he could have easily slept another four hours, but by the time the train pulled out, the crowd was in full swing and all set for a big day. The day was spent profitably in viewing the various exhibits and attending the technical lectures. The fellows arrived home late at night with just as much pep as they had early in the morning. (Some had more!)

We held our annual nomination of local officers June 26. Because of nomination night, we did not hold our regular session of the Radio School.

J. D. Allen, of the Allen Electric Co., passed away June 16, 1941, after an illness of several weeks. With the passing of Mr. Allen, RSA lost a staunch supporter.

Duluth, RSA

Our recent meetings have been held at various places in Duluth, Superior, and Cloquet. It is our belief that we have accomplished much. We have established suggested minimum prices for car radio installations and for push-button resetting. Our regular RSA-NAB ads have been aired daily by WEBC, with copy written by our president. Various publicity stunts have been devised and carried out for the betterment of our own group and of RSA in general. Interesting speakers have been present at almost every meeting.

This is but part of our activities, but from this it is apparent that this chapter has been active during the first half of 1941 and intends to continue for the balance of the year. There is much to do and we intend to do it.

Rudolph T. Luukinen, Secretary.

Freeport, RSA

New officers of the Freeport, Ill., chapter were elected at a recent meeting. These are: S. A. Frank, chairman; Dale R. Roy, vice-chairman, and Winston F. Meyer, secretary-treasurer. A very pleasant evening was enjoyed at the Hooker home, and excellent refreshments were served by our hostess.

W. F. Meyer, Secretary.

(Continued on page 22)

Here's why this "B" battery for portables **OUTSELLS** **ALL OTHERS COMBINED!**



1. "Eveready" "Mini-Max" Radio "B" Battery No. 482 fits more than 90% of the 2,000,000 portable sets now in use!
2. It lasts approximately twice as long (size for size) as batteries of ordinary round-cell design!
3. It costs no more than ordinary batteries for portable sets!

GET YOUR SHARE OF THIS BUSINESS NOW!

FREE! Replacement Guide for portable receivers!
Tells the proper batteries for portable sets.
Accurate! Up to the minute! Write Dept. S-2,
National Carbon Company, Inc., Box 635, New York, N. Y.

Here's the battery for "personal" or "camera-type" radios!



"Eveready" "Mini-Max" Radio "B" Battery No. 467 is the battery around which "personal" or "camera-type" portables were designed. 67½ volts in a space 3⅞" x 2¼" x 1⅞". More and more customers will ask for it.

"EVEREADY"

"MINI-MAX"

RADIO "B" BATTERIES

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation



The words "Eveready" and "Mini-Max" are registered trade-marks of National Carbon Company, Inc.

COMMUNICATIONS RECEIVER

(Continued from page 14)

the Broad and Crystal Sharp settings.

In position 6, or Crystal Sharp, the trimmer C_{30} is adjusted for the sharpest crystal action. Under this condition, the secondary is detuned from the resonant crystal frequency sufficiently so that its resonance curve is not greatly affected by the crystal, but still coupled tightly enough so that it can transfer energy to the crystal circuit. When this point is reached it is indicated by a rise in the output. Two such points of increased output will normally occur, one for each adjustment of the secondary on either side of the resonant frequency of the crystal.

Phasing Control

The phasing control is in the circuit on three positions of the selectivity control, namely, Xtal Sharp, Xtal Medium and Xtal Broad.

The control is used to remove heterodyne interference as well as to minimize other forms of interference having a predominance of high-frequency components, such as static and interference from electrically operated devices.

Noise Limiter

The principle of operation of the limiter is very similar to that of the Lamb limiter. The carrier of the received signal is first converted over to the intermediate frequency and then fed into the 6L7 amplifier and 6B8 AVC amplifier and 6AB7 noise amplifier. A broadly tuned i-f transformer is used in the plate of the 6B8 with its primary and secondary closely coupled. The secondary feeds into the 6B8 diode where rectification of the carrier furnished AVC voltage for the i-f and mixer tube as well as for the 6AB7 noise amplifier. A broadly tuned i-f transformer is used in the plate of the 6AB7, the secondary feeding into the 6H6 noise rectifier. A 455-kc wave trap (CH5 and C55) is used which allows the passage of the higher audio frequencies without attenuation.

These transients will be allowed to rise to a point far above the carrier level with the result that they will be applied to the injector grid of the 6L7 tube without being reduced in value. Transients, such as ignition interference having a steep wave front, consists largely of high-frequency components. The voltage applied to the grid of the 6L7 tube has a negative polarity because of the 6H6 noise rectifier. By varying the anl control, we raise or lower the negative voltage applied to the 6L7 tube until it is barely sufficient to overcome the noise impulses applied to the grid of this tube without allowing the modulation peaks of the carrier to become distorted.

AVC

A double AVC system is used. The r-f and mixer tubes are operated by the broadly tuned carrier coming through only three tuned i-f circuits. The final signal, however, passes through six-tuned i-f circuits. As a result, when the signal is slightly detuned, the receiver output has dropped considerably while the AVC action has dropped but very little. This results in a reduction of be-



The intricate looking controls on the front panel of the SX28 provide those niceties of adjustment, such as calibrated band spread tuning and the like, which are expected from the communications receiver.

tween station noise and a more sharply defined aural tuning action.

Specifications

Power consumption: At 117 volts-60 cycles-138 watts.

Power consumption: d-c operation, 18 amp at 6 volts; or 108 watts.

Power output: 8 watts, undistorted.
Sensitivity: (for 0.05 watts output) bands 1 to 5, 2 mv and under; band 6, 4 mv.

Selectivity: i-f broad (high fidelity): 2x, 12 kc; 1000x, 36 kc.

Selectivity: i-f sharp: 2x, 4.1 kc; 1000x, 22 kc.

Frequency range r-f: 550 to 1,620 kilocycles; 1.5 to 3.1 megacycles; 2.9 to 5.9 megacycles; 5.75 to 11.5 megacycles; 10.3 to 21.5 megacycles; 20.4 to 42 megacycles.

Frequency response a-f (audio filter) out broad i-f: tone control high 70 to 3,000 cycles $\pm 2\frac{1}{2}$ db.

Speaker output impedances: 5000 and 500 ohms.

Intermediate frequency: 455 kc.

Table cabinet dimensions: 20 $\frac{1}{2}$ by 10 by 14 $\frac{3}{4}$ inches deep.

Weight: 75 lbs. net.

BOOK REVIEWS

TELEVISION, TODAY AND TOMORROW, by Sydney A. Moseley and H. J. Barton-Chapple, published by Pitman Publishing Co., 2 West 45 St., New York City, 179 pages, price \$3.00.

This book presents a history and brief description of television. It deals essentially with the Baird system and presents the picture from the British standpoint.

The first chapter deals with the history of television and submits documentary proof of dates of various television accomplishments. Succeeding chapters deal with fundamental concepts of television, dissecting a television picture, generating the pic-

ture signal, ultra-short waves and aerials, cathode-ray tubes, television receivers, large screen television, infra-red images, fog penetration, color television, stereoscopic effects, etc.

The book is written in an elementary style and is profusely illustrated. Of particular interest to this reviewer is a large field strength contour map of the Alexandra Palace television transmitter in London.
R. D. R.

FESSENDEN—BUILDER OF TOMORROW, by Helen M. Fessenden, published by Coward-McCann, Inc., 2 West 45 St., New York City, 362 pages, price \$3.00.

This book presents in interesting fashion the life and work of Reginald A. Fessenden. Written by his wife, this volume is a straightforward account of this man's great work and some of his legal encounters over patents and inventions. As everyone interested in the radio art knows, Fessenden is responsible for a prodigious amount of early work in originating communication and navigation devices.

The book contains many interesting and amusing episodes as related by his contemporaries. Many of the great and well-known names in the radio art are mentioned and often quoted. An interesting addendum contains Fessenden's own account of his discovery of the electrostatic doublet theory and of the nature of cohesion and elasticity. One chapter contains a description of Fessenden's fathometer and the important events connected with its perfection and application.

This book is recommended to all interested in the radio art and in particular those interested in a personal insight into the life of one of radio's greatest contributors.
L. M.

TELEVISION—THE ELECTRONICS OF IMAGE TRANSMISSION, by V. K. Zworykin and G. O. Morton, published by John Wiley and Sons, 440 Fourth Ave., New York City, 646 pages, price \$6.00.

This book is intended for the advanced student or engineer. It deals specifically with electronic television, employing the storage principle rather than other systems.

The first part of the book is devoted to fundamental physical phenomena involved in the television art. This section of the book is concerned particularly with emission of electrons, fluorescence, electron optics, etc. Part two deals broadly with the field of television as a whole—such subjects as the relationship between the physical system and picture quality, the principles of ultra-high-frequency transmission and reception of television signals, and methods of pickup and reproduction of images. In part three the authors present an analysis of the components of the electronic television system based on the storage principle. This section deals in detail with the iconoscope, kinescope, electron gun and associated circuits, the television transmitter, and the television receiver. There follows a description of the equipment involved in the RCA-NBC television project.

This book is one of the most complete technical works on the subject of television that has come to the attention of this reviewer. As might be expected, mathematics is used when required and in some instances the analyses become somewhat involved. The subject matter is well presented and carefully written.
R. D. R.

CIRCUITS

(Continued from page 17)

normal discharge rate, the charging should last as long as the set was used on battery power. The charging should be limited to 12 hours maximum, however. Automatic says it is possible to get from two to five times normal life from the batteries by proper charging. Batteries may be recharged several times unless they have been dried out by excessive heat or long disuse. On and off, for the last 21 years we have heard of charging dry batteries—ever since the days when tubes first appeared on the market. Storage batteries weren't sold by the local drug store or the 5 and 10 in those early days, so many of us used dry cells—and we tried recharging. But it didn't seem to take. Now it seems that another problem has been successfully licked!

Wells Gardner 6B18

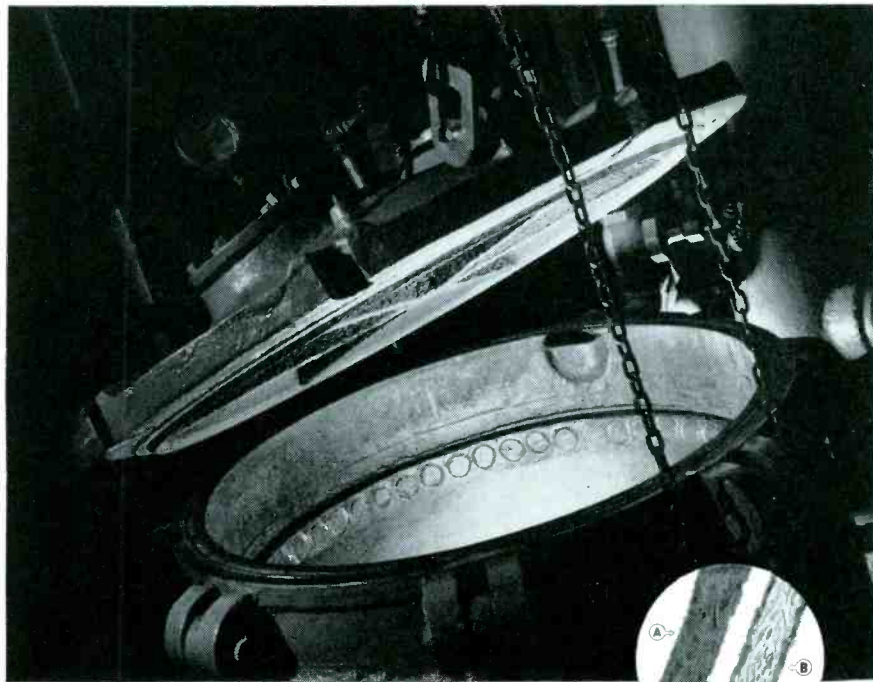
Wells Gardner Series 6B18 three-way portable is a 6-tube job with two i-f stages. Resistance coupling between i-f or detector stages seems to be the rule this year. An unusual feature of this receiver is a plug-in resistor with two separate elements; the first is a 515-ohm line series resistor for the 35Z5GT rectifier and the second is a 2200-ohm A drop resistor. An economizer is also featured which throws a 30-ohm resistor in series with the B — lead, giving additional grid bias to the 3Q5GT power tube.

Lafayette C125

The Lafayette C125 is a rather ambitious layout having 7 tubes and 3 bands—broadcast, police 2.25-7.25 mc, and 5.9-18 mc short wave. Two stages are included, resistance coupled, and a 50L6 beam power tube replaces the 3Q5 battery output tube when the set is operated from the power lines. All the electrolytic condensers are mounted in a condenser block which brings us back to the old days. Two 4½-volt A batteries operate the filaments in series. Note (Fig. 2) that the same tickler coil is used for both short-wave and broadcast bands, but the police band has a separate coil.

Airline 14WG680

Here is a novel 3-way portable especially adapted to automobile operation. Ward's Airline model 14WG680 may be operated in a car in the usual manner using the ordinary loop antenna within the set. However, all of us are aware that the performance is not so hot in a closed, all-steel car. Wards have therefore provided an accessory



Want to Knock the Breath Out of a Piece of Paper?

IT'S done nearly every day, in the Utah factory, as an extra precaution against transformer failure in the field. One of the most common causes of failure in ordinary transformers is due to inadequate protection against moisture.

In these torture chambers, Utah Transformers, encased in layers of specially made, moisture-resistant paper, are heated under vacuum for hours. Thus, all of the air is safely removed from the paper and all of the moisture is evaporated. Only then is the molten wax drawn into the vacuum tank and forced into the emptied cells of the paper under high pressure.



*Photo micrograph showing advantages of (A) Utah's vacuum-pressure, complete, impregnation over (B) ordinary hot-dip, surface coverage method, in which air and moisture remain in cells.



TRANSFORMERS
SPEAKERS • VIBRATORS • UTAH-CARTER PARTS

kit consisting of a whip aerial, floor plate, distributor suppressor, plug-in antenna coil and mounting hardware which converts the portable to a real car set, although the power output isn't up to the standard auto sets. Fig. 3 shows the antenna circuit. An economizer is also included. A panel switch marked "home" and "auto" serves to change over the input circuit from loop to antenna coil.

Wells Gardner 6C17

Wells Gardner Series 6C17 6-tube auto-radio sets have 3-gang permeability tuning and an interesting B fil-

As a result on interlayer insulation is obtained which is impervious to moisture.

This is but one of the reasons why Utah Transformers have established such outstanding records, even under severe conditions. And why they offer you extra value. Utah Radio Products Company, 816 Orleans Street, Chicago, Illinois. Canadian Office: 560 King Street, West, Toronto. In the Argentine: Ucoa Radio Products Company, S.R.L. Buenos Aires. Cable Address: Utaradio, Chicago. Write for the facts about Utah's complete line of transformers.

ter. Fig. 4 shows the r-f filter and surge suppressor resistor connected between the rectifier cathode and the B+ bus. The r-f filter consists of a 0.04-mfd shunt condenser and a 25-ohm r-f choke; the resistor adds an additional 25 ohms.

Wells Gardner 6C18

Another 6-tube Wells Gardner auto-radio receiver, the Series 6C18, features high-power output with a 6N7 Class B power tube and a 6K6GT driver. A considerable amount of de-

(Continued on page 21)

**WORLD'S GREATEST all around
ELECTRIC TOOL**

**DRILLS — GRINDS — SANDS
SAWS — POLISHES
SHARPENS — CARVES**

The new **WHIZ ELECTRIC TOOL** is the handiest power tool ever made. A rugged tool for power and precision work. Drills through 1/4 inch iron plate in 42 seconds or engraves intricate designs. Handles any material: Metals — Woods — Alloys — Plastic — Glass — Steel — etc. Saves time. Eliminates labor. Plug into any socket AC or DC, 110 volts. Chuck 1/4 inch capacity. Ball bearing thrust. Powerful, triple-gear motor. **STANDARD MODEL**, with Normal Speed (uses 200 different accessories, instantly interchangeable). **Price only \$7.95.**

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POSTPAID
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The only DRILL-TOOL with a full year's guarantee.

FREE Accessory outfit (Value \$2) includes set of drills, mounted 1 1/2 inch grinder, sanding discs, cutting wheels, mounted brush, polishing wheel, carving burr, etc. **FREE** with each tool ordered NOW. We pay postage.

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RADIART VIBRATORS
are **EXACT Duplicate**
not only in can size and prong arrangement, but in load limit and in frequency, which are designed to work with the other components of the circuit.

THE RADIART CORP., Cleveland, Ohio

S. E. D.

WATCH FOR IT!

Read SERVICE every month

TUBES

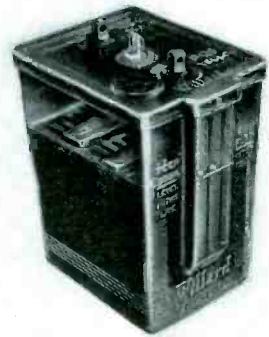
The RCA Manufacturing Co., Inc., Harrison, N. J., are making available two new receiving tubes as follows: RCA-12H6 twin diode, and RCA-117P7 rectifier, beam power amplifier.

The 12H6 is a twin diode similar to type 6H6 except for its heater rating of 12.6 volts and 0.15 ampere. It is being made available for use in applications having 12.6-volt heater supply.

The 117P7-GT is a rectifier—beam power amplifier similar to type 117N7-GT, but having somewhat lower power output capability.

2-VOLT STORAGE BATTERY

A storage battery, Radio 20-2, for use in portable radio sets has been developed by the Willard Storage Battery Co., 246 E. 131 St., Cleveland, Ohio. Development of the new battery makes possible a portable receiver in which the Willard battery is used to supply both A and B power—the



former direct, and the latter by means of vibrator conversion.

This radio battery measures 4 by 3 by 5 1/2 in. Its case is formed of an acid proof transparent plastic. This transparency makes it possible to see the quantity of electrolyte in the battery. It is equipped with a built in charge indicator, and a spillproof cover is provided to prevent loss of the electrolyte. This makes it possible to operate the receiver in a tilted position, on its side, or, for that matter, upside down.

A-C—D-C COMMUNICATION RECEIVER

Howard Radio Co., 1735 Belmont Ave., Chicago, announces a communication receiver, which can be operated from 105-117, 120-150, or 210-240 volts, a-c or d-c. It



employs 6 tubes, has 3-gang tuning condenser with a stage of tuned r-f on all bands. Tunes from 540 kc to 43 mc (556 to 7 meters) on four overlapping bands with band spread on all.

Save your aluminum scrap for national defense. Every little bit helps. See your local Boy Scout or American Legion Commander.

CIRCUITS

(Continued from page 19)

generation is used between the output transformer and the driver cathode through the use of a tertiary winding which delivers the necessary voltage for the proper percentage of degeneration. (See Fig. 5.) This receiver also uses three-gang permeability tuning, thus completely eliminating the gang tuning condenser.

Wells Gardner 8A51

Series 8A51 is another Wells Gardner, an 8-tube, 2-band a-c receiver with an automatic record changer. Two self-contained antennae are provided—loop for broadcast and foil antenna for short waves with provision for an external antenna and ground which serves both bands. The high impedance loop antenna coupling coil is shunted with a 300-mmf. by-pass condenser to prevent the choking action that would otherwise occur to any short wave signals. (See Fig. 6.) On broadcast-band frequencies, the shunting action is greatly reduced, permitting the antenna current to flow through the loop primary.

Another unusual arrangement is the oscillator-converter circuit and tubes. A 6SJ7 converter is fed by a 6J5GT oscillator with cathode-to-cathode coupling through an equalizer. The equalizer consists of an 0.02-mfd condenser shunted with a 2,200-ohm resistor. This is necessary because the 6SJ7 is a sharp cut-off tube and requires rather close tolerances in exciting voltages. Two i-f stages, resistance coupled, are used. The set also has a tone control which boosts highs when turned to the right and boosts lows when turned to the left. (See Fig. 6.) Bass compensation is also provided.

Emerson FJ412

Emerson phonograph combination Model FJ412 has an unusual feedback circuit which is connected from the voice coil to the detector diode through a ¼ meg resistor. On phonograph operation it is switched to the high side of the pickup (from the voice coil) through 1 meg. The tone control and phono-radio switch are ganged together on a single wafer—shown in Fig. 7.

Lafayette E193

Lafayette Model E193 3-way portable, with 6 tubes and 2 bands, features a long-wave band of 150-410 kc for aviation weather data instead of the expected short-wave coverage. A special code-beam filter is provided to eliminate the radio-beam signals when listening to the weather reports. This is necessary as the report and the beam sig-

GET RID OF CIGAR BOX CONFUSION!

**HAVE THE RESISTOR YOU WANT
RIGHT AT YOUR FINGER TIPS**

FREE!...
THE IRC RESIST-O-CABINET

Here's an end to cigar boxes, tin cans, jars and other unsatisfactory make-shift methods of keeping resistors. The IRC Resist-O-Cabinet is specifically designed to hold resistors systematically and safely without bending of leads. It gives you a compact resistor "department" that puts any wanted resistor right at your finger tips and gives you a visual inventory of your resistor stock in a split second. Best of all . . . it's yours without one penny extra cost . . . with any of three factory-packed IRC Resistor assortments.

IRC Type BT Metallized have won acknowledged leadership in every mechanical and electrical characteristic. They're always dependable—they stay put. ½, 1- and 2-watt sizes in all ranges. Insist on IRC's and be sure to get the FREE Resist-O-Cabinet! Your jobber has yours ready.

INTERNATIONAL RESISTANCE CO.
401 North Broad Street Philadelphia, Pa.

INSULATED Metallized RESISTORS

nals are sent simultaneously and without the filter it is very difficult to distinguish the voice. The filter, of course, must not be used on the broadcast band as a part of the middle audio range will be missing. Headphones are recommended for best results in weather reception. This receiver also features a thermal relay which disconnects both A and B batteries from ground when the set is turned on for line operation. (See Fig. 8.)

Lear Avia Portables

Lear Avia, Inc., has a number of portables, some 3-way, some multi-band,

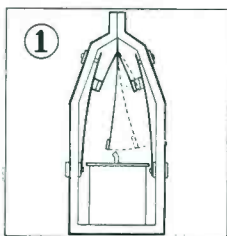
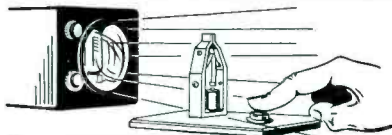
but all featuring aviation band reception. These sets are designed primarily for pilots or airplane passengers and have provisions for interphone—airplane telephone from pilot to copilot, etc.

SELF-CHARGING PORTABLE SETS

Three new self-charging portable radio receivers have been announced by L. L. Kelsey, manager Stewart Warner radio division, 1836 Diversey Pkwy., Chicago, Ill. A feature of these sets is the self-charging circuit which is said to charge any standard dry battery.

Advertisers in SERVICE are world renowned for the quality of their products. Insure your work by buying from them.

See More Positive Action of TURNER Push-Pull VIBRATORS



With "Stroboscac"—the stroboscopic light, the human eye can see the fastest action as in a slow-moving picture. Clearly, lets you see the action of a Turner Push-Pull Vibrator in contrast with an ordinary vibrator.

Diagram 1 shows the action of an ordinary vibrator as seen in front of the Stroboscac. Note the shorter swing of the reed—the unbalanced pressure of contact points.

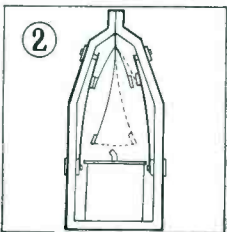


Diagram 2 shows Push-Pull action in front of the Stroboscac. Actually lets you SEE the wider, perfectly balanced swing of the reed, resulting in increased contact pressure and decreased contact resistance.

Turner Push-Pull Vibrators offer longer, more trouble-free life, with steady, chatter-free operation.

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THE TURNER CO.
906 17th St., N.E., Cedar Rapids, Iowa



The Outstanding Tube Tester Value . . . Checks all type tubes including Loctals, Bantam Jr., 1.4 volt Miniatures, Gaseous Rectifier, Ballast, High Voltage Series, etc. Filament Voltages from 1.1 to 110 volts. Direct Reading GOOD-BAD Meter Scale. Professional-appearing case with accessory compartment large enough for carrying Model 739 AC-DC Pocket Volt-Ohm-Milliammeter, thereby giving the serviceman complete testing facilities for calls in the field. . . . Model 432-A with compartment. Dealer Net Price . . . \$20.73. Model 432-A in case less compartment . . . \$19.65. Model 739. Dealer Net Price . . . \$10.89.

WRITE FOR CATALOG—Section 717 College Avenue
READRITE METER WORKS, Bluffton, Ohio

ASSOCIATIONS

(Continued from page 15)

Old Timers

At the second annual meeting of Radio's Old Timers held at the Stevens Hotel, Chicago, during the recent Trade Show, John Olsen was elected president, Ken Hathaway, secretary and Jerry (Stancor) Kalm treasurer for the coming year. Dues were established at \$1.00 per year and it was decided to run a shindig at some time during the 1942 show period. The Old Timers is purely a social group of men associated with radio for 15 years or more. If you fit in this category you can become a member. Write, giving your past radio history to John O. Olsen, 1456 Watersbury Road, Lakewood, Ohio.

Pittsburgh, Pa.

The Radio Servicemen's Association of Pittsburgh held a meeting on June 12 at the Roosevelt Hotel to which the local chapter of the Institute of Radio Engineers were invited. This meeting was a working demonstration of f-m put on by Stromberg Carlson and the Ludwig Hommel Co.

Mr. Levy, an engineer of Stromberg Carlson, spoke on f-m and demonstrated an f-m transmitter built by Ed. Kimball of Tarentum, Pa.

Henry Kaiser, Chief Engineer of WWSW, told of their activities in f-m and said that their plant was complete with the exception of the turnstile antennae. WWSW is going to inaugurate a series of educational articles over their a-m station to let the public know what f-m really is and to stress the point that these receivers should be purchased from organizations competent to install and service them properly. KDKA are running f-m tests at their old Saxenburg Station. However, their new equipment will be installed at the new Allison Park Station with a turnstile antenna on top of KDKA's 718-foot tower.

Richard G. Devaney,
Chairman, Publicity Committee.

RSA Officers

The RSA Board of Directors, in their recent meetings in Chicago, appointed Donald H. Stover as National Executive Secretary of RSA, succeeding Joe Marty, Jr., who resigned to accept a position with a Chicago radio manufacturer. The following officers were elected for 1941-42: president, Kenneth A. Vaughan, 312 Market St., Johnstown, Pa.; vice-president, Edward H. Gordon, LeClaire Hotel, Moline, Ill.; secretary, Calvin W. Stapp, 512 N. Beard St., Danville, Ill.; treasurer, Harold W. Cunningham, 1322 Wilmette Ave., Wilmette, Ill.

The Representatives

At the annual meeting of the representatives, held in Chicago June 10, S. K. Mac-

Donald of Philadelphia was elected president. Irvin I. Aaron was elected vice-president, David Sonkin was reelected secretary-treasurer, and Dan R. Bittan was elected chairman of the board of governors.

Southern New Hampshire, RSA

Our capable chairman, Arthur Sanborn, of Wilton, N. H., made his annual trip to the RSA Convention and the Radio Trade Show in Chicago. His news of the material to be available under raw material restrictions is encouraging. Southern New Hampshire Chapter continues its happy relations with Radio Station WFEA and reports progress with its "Radios for Shut-ins" campaign.

Sylvania Service School

Wherever the population is interested in the sale and application of Sylvania Radio Tubes, Walter R. Jones, Hygrade Sylvania Director of Commercial Engineering, hits the trail almost constantly, conducting Sylvania Service School classes advising radio technicians in all parts of the country on tube applications.

For each of the past six years, Mr. Jones has averaged 48,695 miles of travel, equal to twice around the world, on company business or a total of 292,170 miles. Between trains and special radio engineering assignments, Mr. Jones lectures to radio servicemen and dealers. Over the past three-year period Mr. Jones has spoken 222 hours in 111 Sylvania Service School meetings, an average of two hours speaking time per meeting, and that's not just a lot of talk.

Tricounty, RSA

Members of the Johnstown, Pa., Tricounty Chapter are beginning to feel the shortage of certain radio parts. The treasurer has been instructed to buy up a large supply wherever they can be obtained. (There has been no evidence of this elsewhere as yet.—Editor.)

A supply of rubber stamps bearing the RSA insignia will be obtainable by members to be used to stamp on orders sent to jobbers and other firms. In this way, they will know that an RSA member is giving them business. These stamps can also be used to mark chassis that have been serviced.

Our Chapter has two members serving in the United States Army: John Noll and William Hayes.

No date has been set for our annual picnic since we do not want to conflict with the Pittsburgh Chapter Picnic, as happened last year. Every Johnstown member wants to attend the Pittsburgh affair, especially if it is held at Idlewild, which is only fifteen miles from Johnstown.

The Tricounty Chapter of Johnstown meets every second and fourth Tuesday of the month, second floor of the "Tavern," Main St., Johnstown.

Jesse Bolsinger, Secretary.

Wilkes-Barre, Pa.

"Oscillators and Their Applications" was the subject of a lecture delivered by Walter R. Jones, Hygrade Sylvania commercial engineer, before the Lucerne County Radio Service Association, Wilkes-Barre, Pa. Mr. Jones was honored by a very large attendance. In charge of arrangements and conduct of the meeting was George Isham, Sylvania Radio Tube Field Representative.

CORRECTION

Prices shown in our advertisement on page 40 of June SERVICE should have been
Model 739—
AC-DC Volt-Ohm-Milliammeter . . . \$10.89
Model 738—
DC Volt-Ohm-Milliammeter . . . \$8.25
Readrite Meter Works, Bluffton, Ohio

CIVILIAN TECHNICAL CORPS

Announcement was recently made of the formation of the British Civilian Technical Corps, a non-military body of paid volunteer technicians in certain skilled trades, open to United States citizens, to maintain and operate the highly technical devices used by the British in their war effort.

The Corps is particularly seeking to enroll radio men for overseas service. Corps officials stress that knowledge of radiotelegraph code is not required. Applicants are, however, expected to have a good knowledge of fundamental radio theory and practical experience in handling modern radio apparatus. It was said that many experienced amateurs and professionals have acquired what is almost an instinctive ability quickly to diagnose faulty operation, and that such ability will be invaluable for the projected assignments in the Civilian Technical Corps.

Additional Information may be obtained from the British Consulate, 25 Broadway, New York City.

DISTRIBUTOR CONVENTION

Under the impetus of National Defense and other related forces at work in the American industrial world, the usefulness of the vacuum tube is being expanded to tremendous proportions, with the result that new vistas of opportunity are opening for parts distributors throughout the country. There are indications that the future

of some industries is being shaped today by new uses found for the vacuum tube in machinery and instruments of many varied types.

L. W. Teagarden, manager of RCA Tube and Equipment Division, presents this look into the future following the second annual RCA Tube and Equipment Distributor Convention in Chicago, where hundreds of jobbers got a glimpse ahead at the "Electronics on Parade" dramatization.

He pointed to the RCA Electron Microscope, one of the principal features of "Electronics on Parade," and RCA large screen home television as examples of the new uses being found for the vacuum tube.

KEN-RAD DISPLAY MATERIAL

The Ken-Rad selling plan, "Ken-Rad on Parade," is keyed with the national defense program in a timely manner, it is said. Ken-Rad display material available to dealers shows animated cartons and tubes in military settings. An attractive edition of "Ken-Rad Selling Helps for Dealers" includes many business-getting sales aids.

TELEVISION RECEIVERS

In keeping with commercialized television broadcasting which took effect July 1, 1941, television receiver production is being resumed by the Allen B. Du Mont Laboratories, Inc., Passaic, N. J. Additional factory space for this purpose has been acquired outside the company-owned factory building, which is already crowded with cathode-ray tube and instrument production as well as National Defense contracts.

PATENTS UPHELD

In an opinion dated June 19, 1941, in the case of *Samuel Ruben & P. R. Mallory & Co., Inc., v. Ariston Laboratories, Inc.*, Judge Barnes of the United States District Court for the Northern District of Illinois, Eastern Division, upheld the validity of the Ruben patents Nos. 1,710,073 and 1,714,191, covering dry electrolytic condensers, and found that defendant had infringed. The Mallory Co. is the exclusive licensee under these patents, with the right to grant sublicenses.

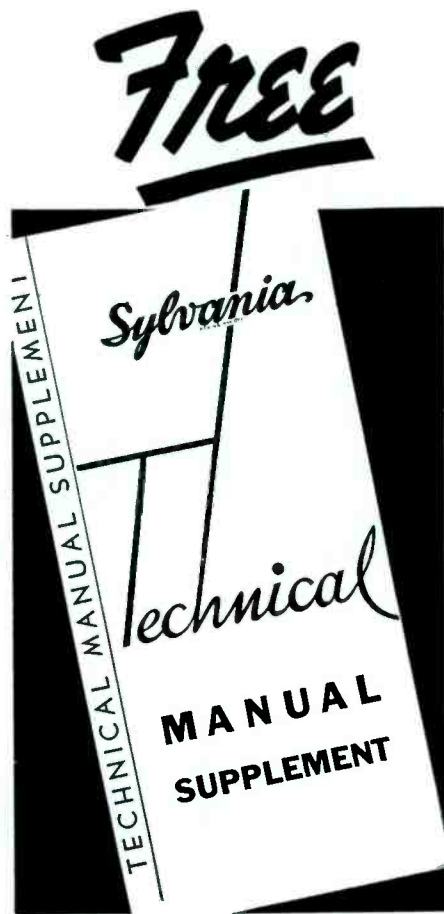
GLASS BASE DISCS

Glass will be used as the base for the Columbia Recording Corporation's instantaneous acetate recordings in order to release the aluminum, which has been used, for U. S. defense requirements. Use of the new-type discs is to start soon.

RMA OFFICERS

At the seventeenth annual Radio Manufacturers Association Convention in Chicago the following officers were elected for 1941-42; President, J. S. Knowlson; vice-presidents, Paul V. Galvin, Roy Burlew, H. E. Osmun, and James P. Quam; treasurer, Leslie F. Muter; executive vice-president, Bond Geddes; general counsel, John W. Van Allen.

Standard, nationally known parts and accessories are guaranteed for quality and performance. It pays to use them—and only them—in your work.



SUPPLEMENT TO SYLVANIA'S TECHNICAL MANUAL

THIS supplement lists all the types of tubes announced since the Fifth Edition, Second Printing of the Sylvania Technical Manual was released.

Base views and operating characteristics are either given . . . or referred to equivalents. This saves time and space. Cross references used are clear and easy to follow.

The supplement is so made that you can glue it inside the Sylvania Technical Manual you now have. If your Manual is old or worn . . . order another. The supplement is already glued in the new Manuals.

The cost for a complete Manual is but 35¢. The supplement, as we said, is sent to you free. Mail your request for one or both to The Sylvania Tube Division, Hygrade Sylvania Corporation, Emporium, Penna.

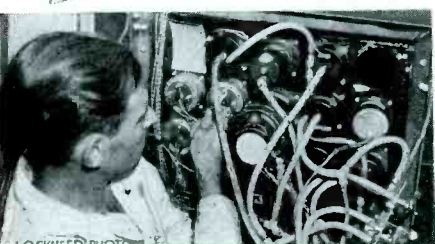
SYLVANIA RADIO TUBE DIVISION

HYGRADE SYLVANIA CORPORATION

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Also makers of Hygrade Lamp Bulbs, Hygrade Fluorescent Lamps and Miralume Fluorescent Light Fixtures

AVIATION NEEDS
Radio and Instrument Men



● Urgent need for radio service men trained for radio installation work in aircraft manufacturing. Your previous experience, plus short, special aircraft training, leads to interesting, good-pay jobs . . . which include electrical and instrument installation. Training also is foundation for lifetime career in aircraft manufacturing, in airline radio and instrument work, or in Civil Service at Army and Navy aircraft maintenance depots. All these divisions of booming aviation industry calling for many more trained men than we can supply. This oldest and largest school of its kind will send you complete information on its fine training for a MORE profitable lifetime career . . . and on your big IMMEDIATE opportunities. Send coupon NOW.

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Please send details on opportunities in Aviation for radio service men.
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In 400, 600, 1000 and 1500 v. D.C.W. All popular capacities. Insist on Aerovox—with yellow label!



Better PAPER TUBULARS

Sold by the hundreds of thousands, true, but each and every Aerovox paper tubular is individually tested. Please remember that. Also, constant refinement has resulted in a high-quality product regardless of low cost. Now in sparkling yellow, black and red label jackets. Ask your jobber for Aerovox paper tubulars. Ask for latest catalog. Or write us direct.



BUT WHAT OF Tomorrow?

"All-out" production to meet today's pyramiding orders does not mean that Triplett has lost sight of the broader requirements of tomorrow. Instead, research and engineering programs actually have been "stepped-up" to assure constant improvements in products and processes; in addition to needed developments in new fields.

Today's demands are important, but the needs of tomorrow cannot be slighted—and are anticipated in never flagging engineering and research developments. You have assurance that in the months and years to come, new Triplett products will serve in expanded fields, where they will merit values and savings for every dollar spent in their purchase.

**THE TRIPLETT ELECTRICAL
INSTRUMENT CO.**
Bluffton, Ohio

Catalogs, etc. . . .

Copies of the catalogs and bulletins discussed below may be obtained directly from the respective manufacturers mentioned. Write for them today!

Atlas Sound Corp., 1443-39 St., Brooklyn, N. Y., have issued a 12-page catalog, No. F41, which illustrates and describes their Morning Glory Projectors, p-m driver units, exponential bell trumpets, speaker cabinets, etc.

Catalog No. 142 from General Cement Manufacturing Co., Rockford, Ill., is a 36-page booklet which describes and illustrates cements; compounds, contact dressing; dial belts and cables; extension cords; furniture repair kits; finishes; grommets; hardware; knobs; solder; spaghetti and other radio accessories.

A 20-page catalog, No. 11, has been released by Howard B. Jones, 2300 Wabansia Ave., Chicago, illustrating and describing their line of multi-contact plugs and sockets, terminals, terminal panels, fuse mounts, etc.

The new Ken-Rad Essential Characteristics booklet gives technical characteristics on glass and metal tubes. It is a book that every dealer can well use, and is available, without charge. Ken-Rad Tube & Lamp Corp., Owensboro, Ky.

Meissner Manufacturing Co., Mt. Carmel, Ill., have issued their 32-page 1941 general catalog of radio parts, kits and sets.

National Recording Supply Co., 1065 Vine St., Hollywood, Cal., have issued a folder describing their professional and home recording discs and supplies.

The New England Chapter of "The Representatives," headquarters Boston, Mass., have prepared a folder giving vital statistics of the New England market.

A complete engineering and amateur guidebook on transmitting tubes is being made available by RCA Commercial Engineering Section, Harrison, N. J. It contains comprehensive data on 69 air-cooled transmitting tubes, including the new types 815, 816, 8000, 8001, 8005 and the midjet tubes 9001, 9002, and 9003. Complete data supplemented by proven circuits show how transmitting tubes may be used to the best advantage. The book contains 150 circuits and illustrations and is twice the size of last year's edition. Price, 25c.

An information booklet describing a Practical Radio and Communication Engineering Course designed for home study is available from the Smith Practical Radio Institute, 1311 Terminal Tower, Cleveland, Ohio.

Among new literature issued by Solar Mfg. Corp., Bayonne, N. J., is a bulletin which surveys the present difficulties experienced by the condenser industry as created by our defense effort. The bulletin is called "Defense and You." Catalog 11, which gives specifications and illustrations of generally available condenser types and ratings, is also obtainable.

A 16-page descriptive folder on the Western Electric Type 6B Audiometer, a device for the diagnosis of hearing defects, is available from Western Electric Co., 195 Broadway, New York City.

Personnel . . .

S. N. Shure announces that Joe Marty, formerly Secretary of the Radio Servicemen of America, is now associated with Shure Brothers, Chicago.

Paul H. Tartak, president of Oxford Tartak Radio Corp., Chicago, announces that Karl A. Kopetsky, formerly managing editor of Radio News has joined the firm as a member of the executive staff. Mr. Kopetsky's immediate duties will include the coordination of the company's expanding activities to provide for National Defense requirements in addition to the firm's regular business.

Appointment of Irvin I. Aaron & Associates, 4028 N. 16 St., Milwaukee, Wis., as sales representative has been announced by The Turner Co., Cedar Rapids, Iowa. Territory to be covered will include Minnesota, Wisconsin, and parts of North Dakota and Illinois.

Weston Electrical Instrument Corp., Newark, N. J. have announced the appointment of Edward S. Sievers, 567 Subway Terminal Bldg., 417 So. Hill St., Los Angeles, Cal., as Weston representatives. John D. Farneman will be associated with Mr. Sievers in this territory.

Representatives . . .

E. O. (Suds) Sutherland has joined the staff of S. H. Conn Sales Co., who are located in their new quarters at 2533 South Hill St., Los Angeles, Cal. Conn Sales have taken on the Atlas Condenser Corp., and the Mark Simpson lines for West Coast distribution.

Herb Erickson Co. is now located at Flanders Avenue, Hendersonville, N. C. This is 21 miles south of Asheville and and 10 miles north of the South Carolina border.

After leaving Chicago, W. Bert Knight, in company with Herb Bell of Packard Bell Co., radio manufacturers in Los Angeles, spent a week in Northern Wisconsin doing a little fishing.

In notifying the trade of their change of address, Le Cointe Radio & Electric Co. take this opportunity of extending a personal invitation to everyone to visit the new store at 332 Main St., Racine, Wis.

Meissner sales representatives and factory men had an enjoyable luncheon, June 9, in the Stevens Hotel, Chicago, immediately following the annual sales conference. Present at the affair were: Jack West, Bert Heuvelmann, Merton Dobbin, Charles Pointon, Jim Miller, J. Earl Smith, Bill Carduner, John Olsen, J. J. O'Callaghan, B. J. Fitzner, G. V. Rockey, E. M. Braun, J. E. McKinley, Jack Clawson, R. W. Mitscher, Harry Lasure, Bill Purdy, Ernest Scott, Jim Kay, Jim Rachels, Bill Atkins and Jerry Pointon.

Raytheon Production Corp. held their annual Mid-Western sales meeting during the Radio Parts Manufacturers Show in Chicago. The meeting was presided over by Earl Dietrich and E. S. Riedel. Sales and advertising plans were outlined for the balance of 1941, and new advertising displays were exhibited.

NATIONAL DEFENSE AND RADIO

(Continued from page 4)

ments are progressing at full speed. Solutions to such problems as capacitive changes, lack of low-frequency response and other variable factors characteristic of crystals in installations where the temperature rise is great, should be at hand soon.

Other Substitutions

Because of the restrictions on formaldehyde, used in fabricating bakelite, molded mica condensers are now being processed experimentally with such substitutes as cellulose acetate. Ceramic sealed condensers are supplanting these condensers in many instances.

Spring brass on trimmers is being supplanted by steel, treated in the same manner as the plates of the variable condenser.

One leading manufacturer has developed an i-f transformer mounted in a steel container which is said to have an equivalent efficiency to those now using aluminum. Where space is not an important factor, iron shields are being used.

Nickel-chrome stainless steel, used in

some shafts and controls, has been eliminated from the scene of production since it contains both nickel and chromium, two essential defense metals. In its place chromium stainless steel is being substituted. The most important difference here is that chromium stainless steel may require slightly more polishing and cleaning than steel in which nickel is included.

A census of a number of the leading set manufacturers indicates that plastic chassis will definitely not be used. Fragility and die problems are too numerous to effect the change to plastics. Copper flashed or scrap metal sprayed over steel, or any other available metal, will be used. Chassis now being processed are extremely skeleton styled in appearance, with metal being used only where absolutely essential for structural and electrical efficiency.

The fact that plastics will not be used in this particular instance should not be taken as an indication that it is an inferior substance. It just happens that the structural problems of the radio chassis are such as to make it too impractical at this time.

Because of the scarcity of screw machine parts, stampings are being used. However, care is being exercised to stamp all parts so as to facilitate servicing. Some parts will, of necessity, have to be self-contained. When defects in such parts are encountered in servicing they should be completely replaced.

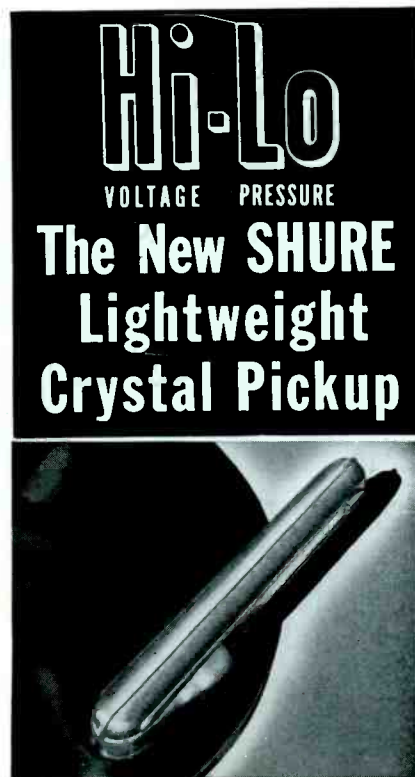
In view of the many substitutions being made in the new receivers and the corresponding change in design, the Service Man should school himself thoroughly with not only all available data supplied by the manufacturer, but defense news as well. The new receivers will present service problems that will be new, and perhaps knotty, and will thus necessitate a wider scope of information.

RCA COOPERATES WITH CTC

Indicative of the diverse ways in which American educational organizations may lend their assistance in the Aid-to-Britain program is the cooperation of RCA Institutes with the British Civilian Technical Corps. The Corps, a newly formed British organization, is enrolling radio and other technicians for civilian service overseas.

Charles P. Pannill, President of RCA Institutes, has announced that the Institutes is assisting the Corps in the examination of personnel for servicing and maintaining the highly technical equipment now in use by the British. Such equipment is said to include the new Radiocator which Lord Beaverbrook states is being used with extraordinary success in combating enemy air raids over Britain.

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Sound News...

Additional information on the products described below may be obtained, without obligation, directly from the respective manufacturers.

MICROPHONE STAND

Atlas Sound Corp., 1443-39 St., Brooklyn, N. Y., have developed a trigger adjustment for their microphone floor stands. A slight pressure on the trigger frees the telescoping tube section for downward or upward adjustment of the stand. The adjustment may be made with one hand as shown to the right, it is said.



MOBILE SOUND

An all-purpose sound system, complete in one unit including amplifier, controls and record player, has been announced for use in mobile, portable, or permanent installations, by George Ewald, RCA Commercial Sound Division, Camden, N. J. The system operates from 105-125-volt, 60-cycle power lines or from a 6-volt d-c
(Continued on page 27)

The turntable of the RCA all-purpose mobile amplifier, is mounted atop the amplifier case in conjunction with a crystal pickup. Tone

and volume controls are at the base of the unit. It may be used with a variety of loudspeaker and high impedance microphone types as the particular application may require.



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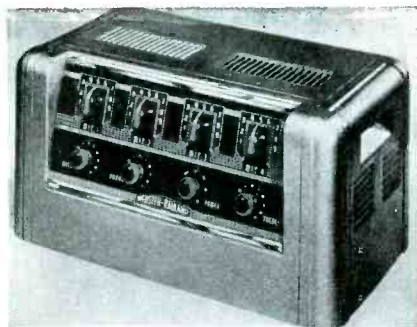
SOUND NEWS

(Continued from page 26)

source. It delivers 15-watts output and measures 16½" by 12" by 12".

POWER AMPLIFIER

Webster-Rauland, 3825 Armitage Ave., Chicago, have announced their new 60-



watt Bi-Power amplifier. The unit has a circuit using a 5-tube power output consisting of 3 rectifier tubes, types 83 and 5U4, and two 6L6G tubes. It incorporates such features as: 4 microphone inputs, 2 phono inputs, with dual fader; complete mixing and fading on all 6 inputs, separate bass and treble tone controls; remote mixing of 3 microphones and illuminated panel.

CENTRALIZED SOUND SYSTEM

Erwood Sound Equipment Co., 225 West Erie St., Chicago, have announced a centralized public address system that is particularly adapted to clubs, schools and similar-institutions that require the distribution of either phonograph, radio or microphone programs. The system utilizes a

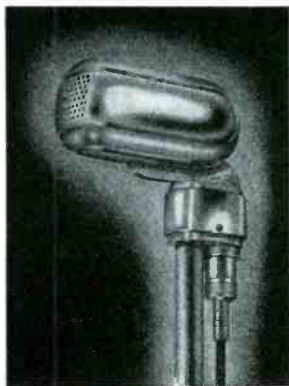


seven-tube, 30-watt amplifier that has provision for two microphones. It also incorporates an automatic record changer, a 9-tube radio set and monitor speakers. The entire assembly is contained in tweed covered portable carrying case.

DYNAMIC MICROPHONES

The Turner Co., Cedar Rapids, Iowa, are announcing a new dynamic salt-shaker type microphone, No. 211, which utilizes a new type magnet structure and acoustic network. The high-frequency range has been extended, and the extreme lows have been raised 2 to 4 db, to compensate for over-all deficiencies in loudspeaker systems, it is said. These units have tilting heads,

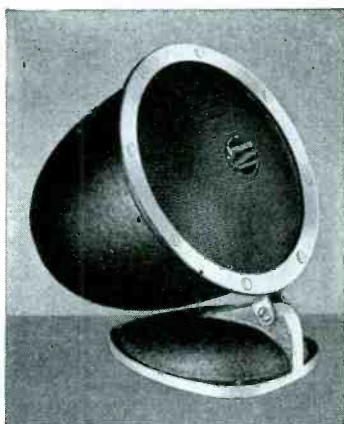
balanced line output connection and are finished in satin chrome. Output level is



—56 db below 1-volt per bar for hi-impedance units.

"SPEECH-MASTER"

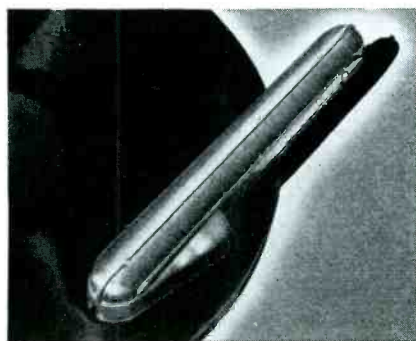
A new type AP "Speech-Master" reproducer, has recently been announced by Jensen Radio Mfg. Co., 6601 S. Laramie Ave.,



Chicago. Two models are available—the AP-10 for desk or wall mounting, and the AP-11 for panel mounting. A special p-m unit, employs Jensen Peri-Dynamic principle. Power rating is 5 watts maximum.

LIGHT WEIGHT PICKUP

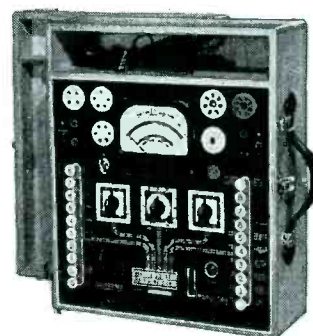
Shure Brothers, 225 W. Huron St., Chicago, have announced their Model 97AN Hi-Lo, 1-oz crystal pickup with a permanent sapphire point. In the new pickup, it is said, the type of cartridge bearing seats provide an easy up and down motion of the moving system to over-



come pinch effect and follow record grooves correctly. Offset head and streamlined plastic arm finished in mahogany. A set screw permits changing needle without replacing cartridge.

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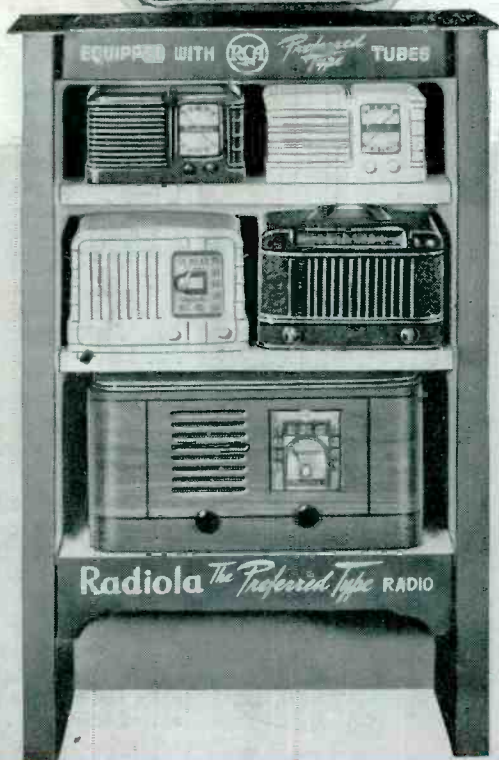


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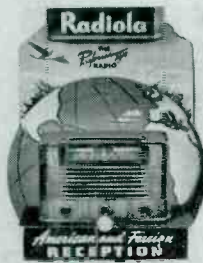
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EYE-CATCHING is the word for this new Radiola Merchandiser! It features Jinx Falkenburg, the "Radiola Girl"—America's most popular model and star of the new Columbia Pictures' feature, "Two Latins From Manhattan." Jinx, in person, enjoyed meeting many Radiola Distributors at the recent RCA Tube and Equipment Convention in Chicago.



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