Leader), Valfer, William P. Kennedy, and Miles R. Hall, all of PSW; Jack F. Carter, R-5; Karl W. Spelman, R-4; Bill Morton and Tommy R. Hensley of the Electronics Center; Chester A. Shields, Director, and Lewis E. Hawkes, Administrative Management, Washington Office, and Merle S. Lowden, Director, Fire Control, Washington Office. Hawkes had come in from R-3. Others were added as the study progressed.

42. Edward W. Schultz [Deputy Chief, Forest Service, for Administration] to Regional Foresters, 5 Ausust 1970, Gaylord A. Knight Collection. Memo includes roster and agenda.

43. L. E. Hawkes, "Financing a Forest Service Telecommunications System," 20 May 1971, typed rough draft for Telecommunications Study, Gaylord A. Knight Collection.

44. Hawkes, "Financing," p. 2.

45. T. R. Hensley, "New Technology and Its Possible Applications," [n.d.], typed draft for Telecommunications Study, p. 2, Gaylord A. Knight Collection.

46. U.S. Department of Agriculture, Forest Service, *A Study of Forest Service Telecommunications*, 4 vols. (Washington, D.C.: Government Printing Office, 1972).

47. Forest Service, *Telecommunications*, vo. 3, pp. 5, 6.

48. Forest Service, *Telecommunications*, vol. 3, p. 7.

49. Forest Service, *Telecommunications*, vol. 3, pp. 67, 68.

50. Forest Service, *Telecommunications*, vol. 3, pp. 5, 6.

51. Forest Service, *Telecommunications*, vol. 3, p. 5.

52. Harold K. Steen, *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 1976), p. 133.

53. [D. S.] Nordwall, "Memorandum for the Record--Radio Laboratory Inspection," 24 March 1947, app., Gaylord A. Knight Collection; F. V. Horton, "Memorandum," 19 May 1946, National Archives and Records Service, Seattle, Wash., Box B4266; Harold K. Lawson, interview with the author in King City, Ore., May 1978; and W. Frederick Biggerstaff, interview with the author in Saratoga, Calif., January 1978.

54. Forest Service, *Telecommunications*, vol. 3, p. 45. The Study Group was equally complimentary to the entire communications organization of the Forest Service.

55. Fred Link, telephone interview with the author in Denver, Colo., 26 January 1979.

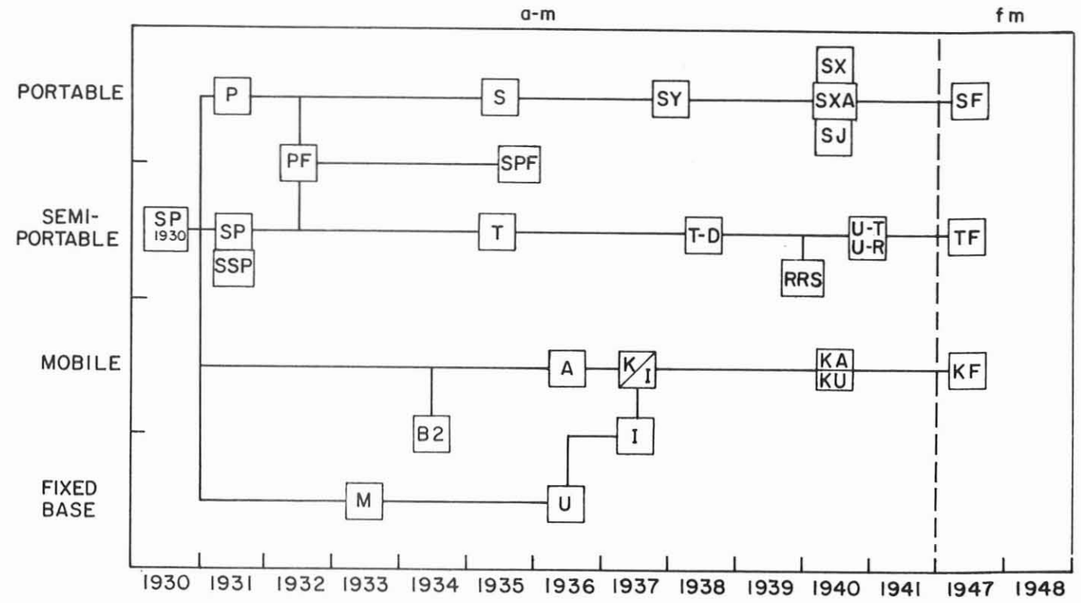
56. Milton Calloway, John Robertson, Charles Kern, and John Hertz, group discussion with the author at the Aerial Fire Depot, Missoula, Mont., May 1978.

57. The radio function was realined in the Washington Office in 1980-81 under the Computer Technology and Telecommunications Staff--at first renamed Radio Management, then changed back to Communications and Electronics, and finally Radio and Electronics--with some shift in responsibilities. There is a basis for some concern over the potential for misjudgment. *Radio for the Fireline* recounts many of the problems associated with past administrative decisions of a like nature. It is hoped that this history will provide a more thorough understanding of the relationship of telecommunications planning to other Forest Service programs, as well as point out a priceless legacy, and a future, which "warrants no apology."

Appendix I

Forest Service Radio Models—Photos, Diagrams, and Data

Chronological Development of Forest Service Radio Sets, by Type and Function



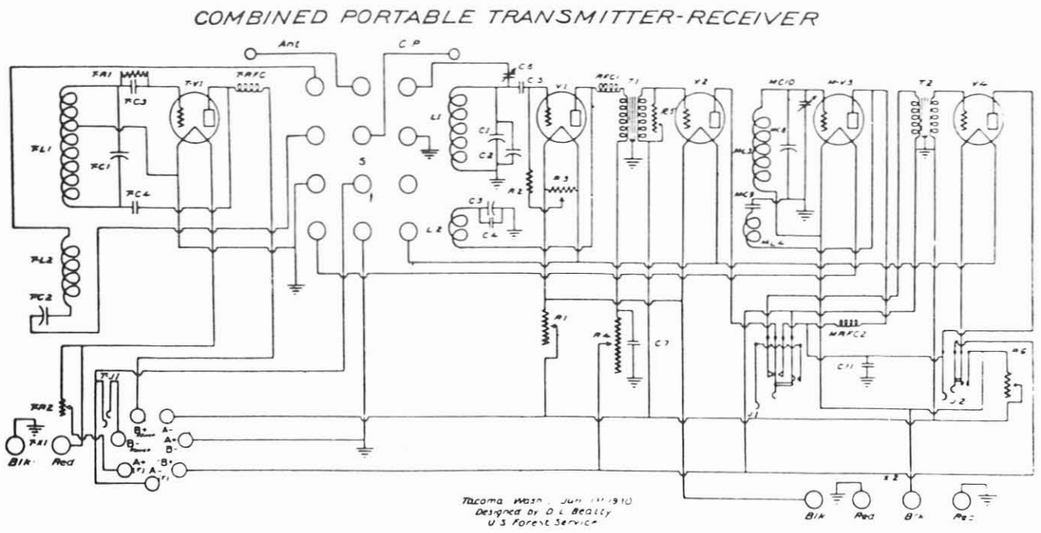
Hf Types

100 meters (2.9–3.5 MHz)

(NA:95G-249757)

SP - 1930

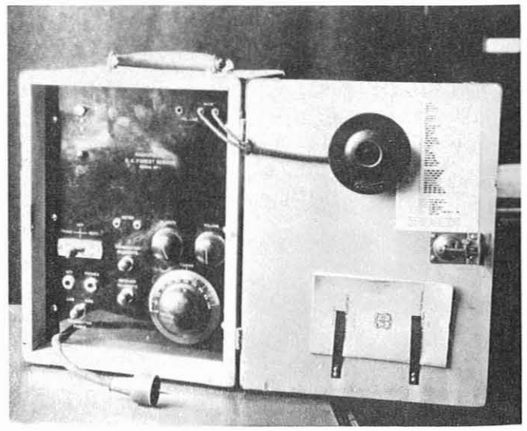
Designed by:	Dwight L. Beatty, 1930
Number produced:	9
Price:	$140
Models:	Original only
Frequency:	3 MHz
Transmitter:	1 watt, c.w., AM
Receiver:	Regenerative
Antenna:	Long wire with counterpoise
Dimensions:	6 x 14 x 8"(radio only)
Weight:	17# 14 oz. (79# 5 oz. complete)*
Principal use:	Test purposes
*Comments:	Radio: 17# 14 oz. Equip. case: 11# 11 oz. Antenna equip.: 5# 12 oz. Battery with case: 44#



Schematic Diagram, SP-1930

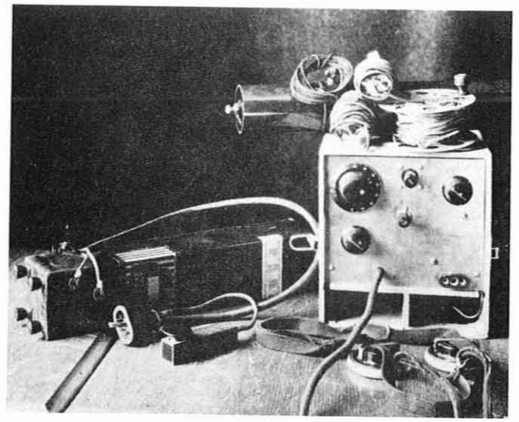
(National Archives:
Record Group 95G-262848)

(NA:95G-274968)



Type SP

	'Semiportable' SP*	SSP*
Designed by:	Harold K. Lawson, 1931	HKL, 1932
Number produced:	500	See SP
Price	$146	
Frequency	3 MHz	
Transmitter:	1 watt, voice-c.w., AM, VFO	4 1/2 watts
Receiver:	Regenerative, simplex	
Power:	Dry batteries	
Antenna:	135'/75' Center loaded (see text)	
Weight:	20# net, 55# w/batteries	
Dimensions:	9 x 10 x 13"	
Principal use:	Lookouts and other temporary locations	
*Comments:	Both sets used modified circuit of SP-1930 (see diagram) Type SSP had higher first cost, but lower operating cost	



(NA:95G-274971)

Type P*

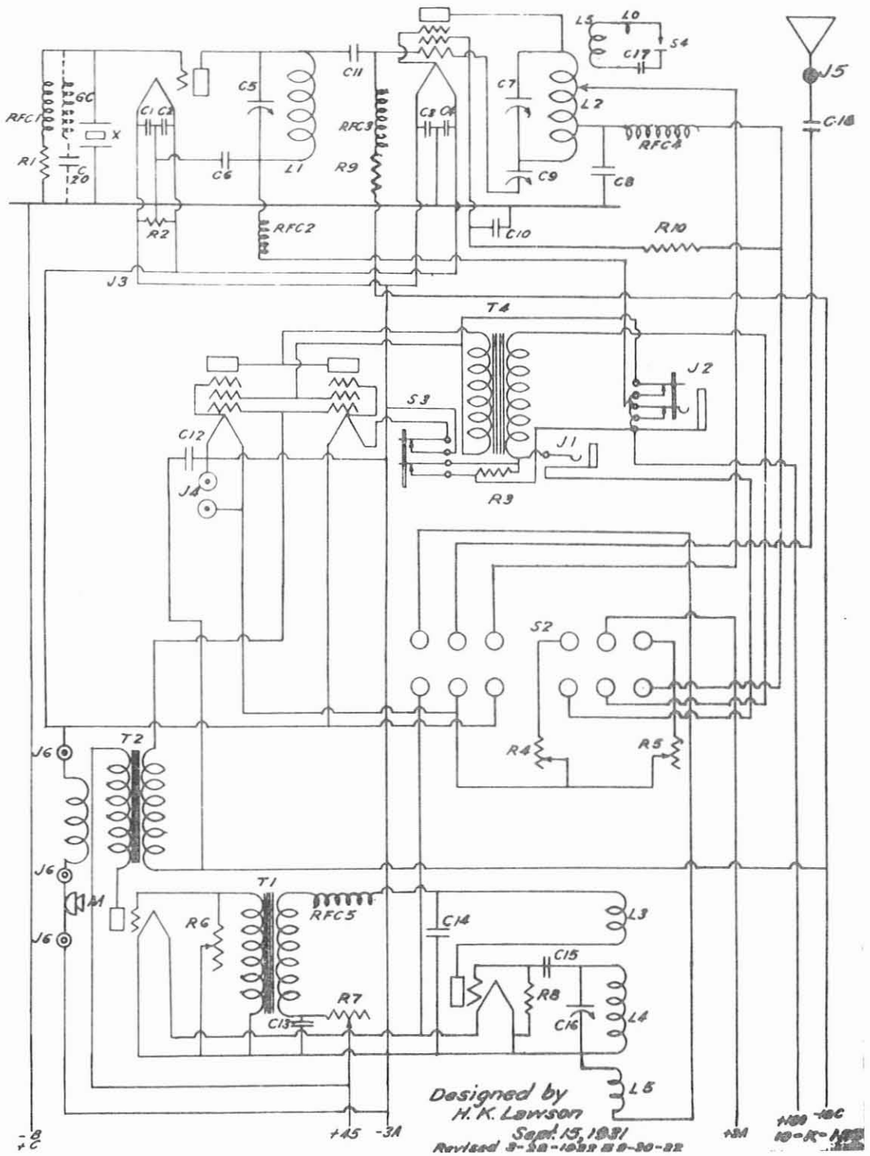
'Portable'

Designed by:	W. Foy Squibb, 1931
Number produced:	104
Price:	$50
Frequency	3 MHz
Transmitter:	1 1/4 watts, c.w., AM, VFO (set and lock)
Receiver:	Regenerative, simplex
Power:	Dry batteries
Antenna:	75' Center loaded (see text)
Weight:	5# 9 oz. - 12# complete
Dimensions:	6 x 7 x 7"
Principal use:	Smokechasers, fire scouts, and trail crews
*Comments:	It used a slightly modified circuit of SP-1930 (see diagram)

R-6
F.C. Radio
SP Spec

SCHEMATIC DIAGRAM

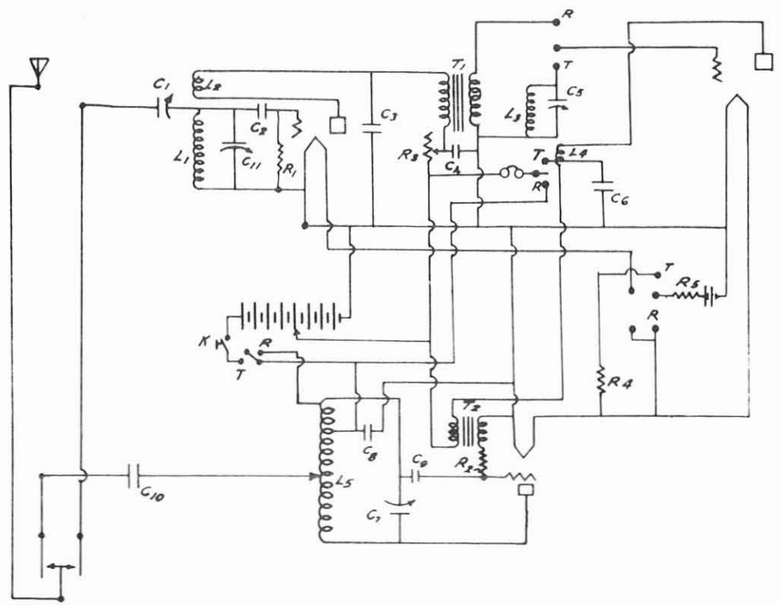
U.S.F.S. SP RADIOPHONE



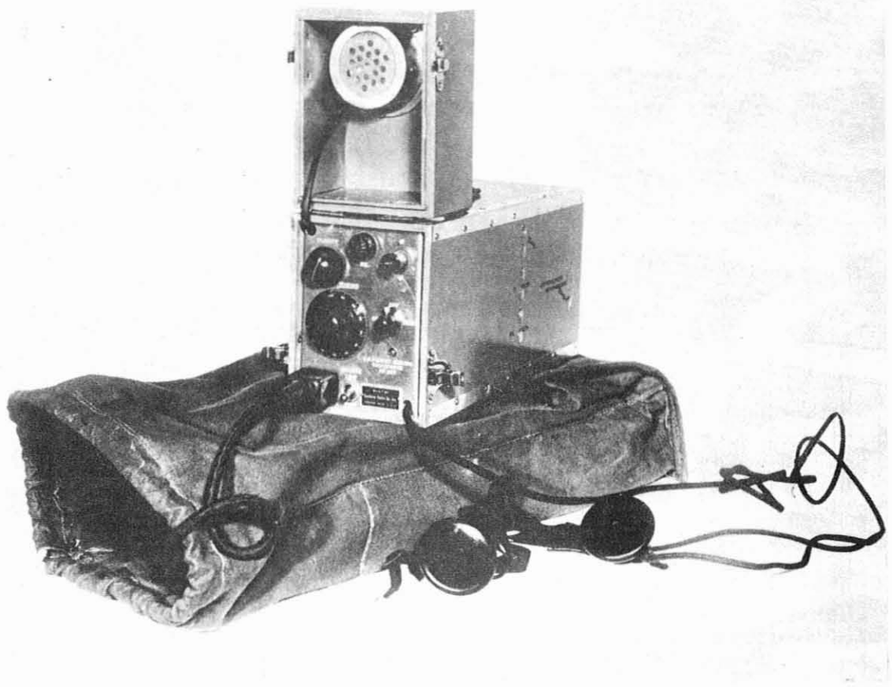
F.C. Radio
Portable

SCHEMATIC DIAGRAM

U.S.F.S. PORTABLE RADIO



Designed by
W. F. Squibb
Dec. 1931 Revised 9-27-32
10-K-159
K68

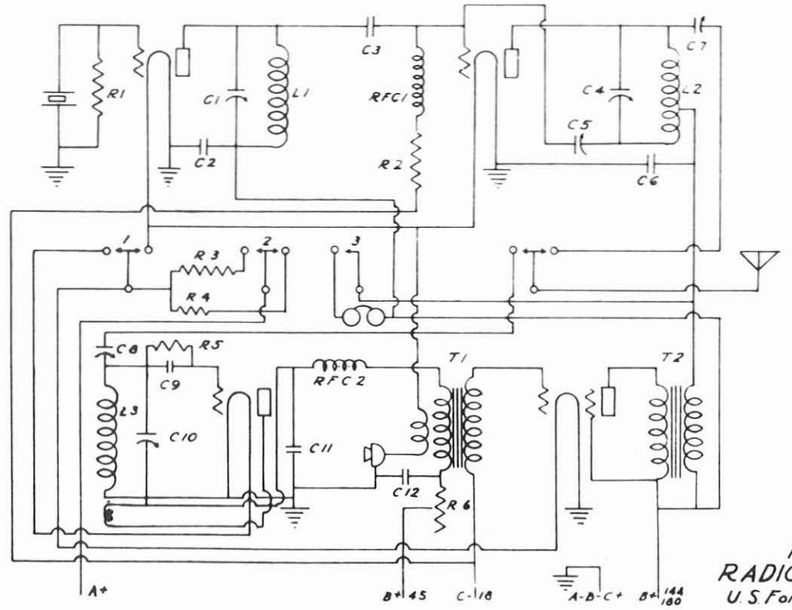


(Forest Service photo, History Section)

Type PF

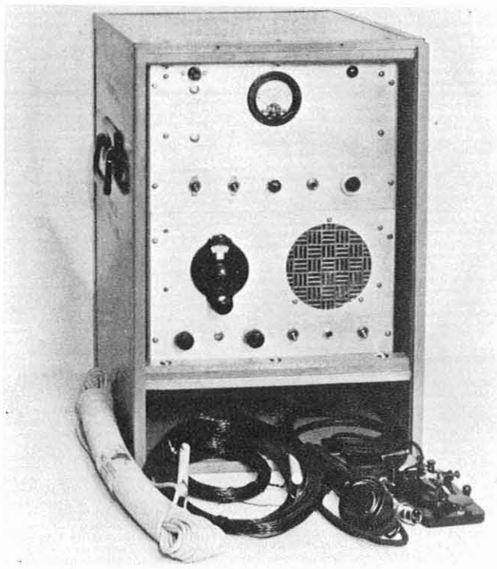
'Portable Fone'*

Designed by:	Harold K. Lawson/W. Foy Squibb, 1933
Number produced:	450
Price:	$60-$75
Frequency:	3 MHz
Transmitter:	2 1/4 watts, voice-c.w., AM, xtals
Receiver:	Regenerative, simplex
Power:	Dry batteries
Antenna:	Center loaded, half wave (see text)
Weight:	14-15#
Dimensions:	4 x 5 x 16"
Principal use:	Smokechasers and work crews
*Comments	Sometimes advertised as "Portable Fireman" PF Kitbox included heavy-duty batteries



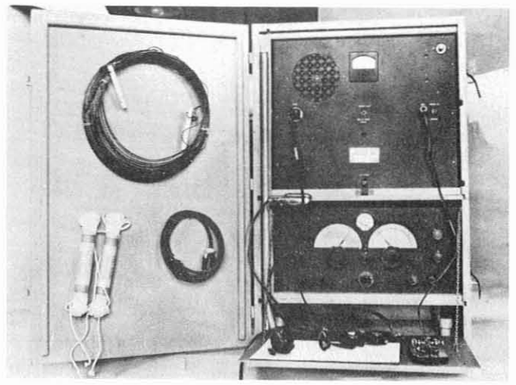
Schematic Diagram, Type PF

Type M, Model D



(Forest Service photos, History Section)

Type M, Model C

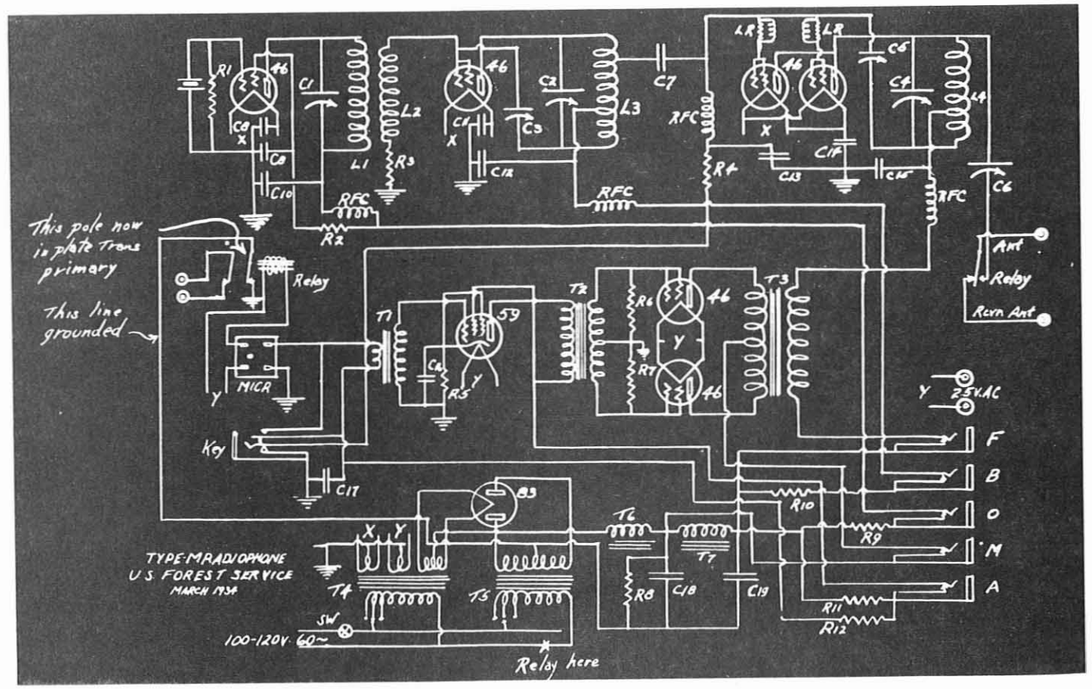


Type M*

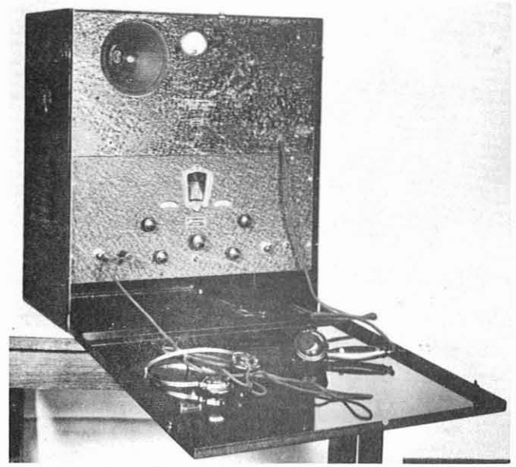
'Medium power'

Designed by:	Harold K. Lawson, 1933
Number produced:	210
Price:	$290
Models:	A, B, C. (Belleville), D (Claypool)
Frequency:	3 MHz
Transmitter:	20 watts nominal, voice-c.w., AM, push-to-talk, xtal
Receiver:	Hammurland Comet Pro and other commercial types; later models Forest Service superheterodyne
Power	110 volts (a.c.) or gas engine generator
Antenna:	Half-wave, single wire feeder
Weight	75-200# depending on model
Dimensions:	10 x 14 x 22" (transmitter only)
Principal use:	Central station for fire crews and supervisor's headquarters
*Comments	Model A (2 units) Serial Numbers 1-96 Model B (1 unit) Serial Numbers 97-152 Model C (1 unit) Serial Numbers 154-180 Model D (1 unit) Serial Numbers 181-210

Schematic Diagram, Type M-Model A



Type M-Model B



(Forest Service photo, History Section)

Schematic Diagram, Type M-Model B

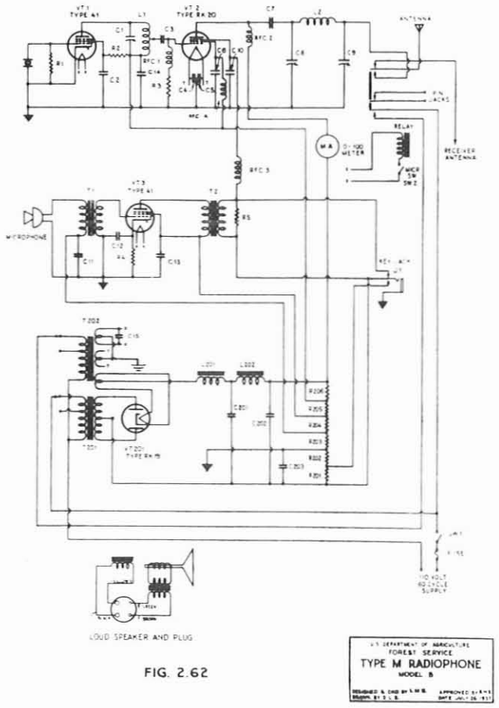
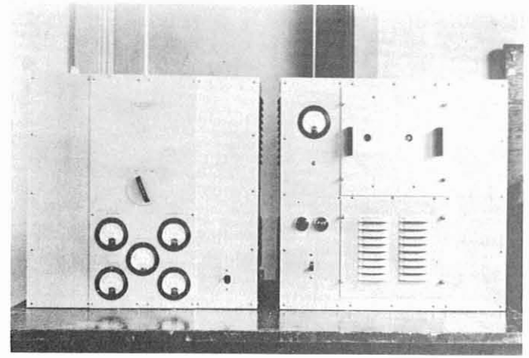


FIG. 2.62

Type B

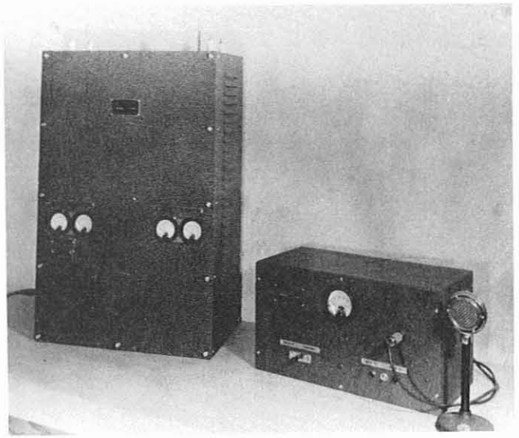


(NA:95G 305779)

Type B*

'Boat'

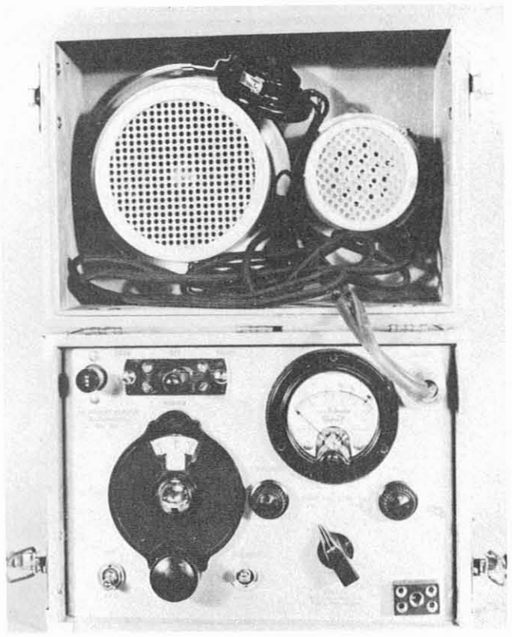
Designed by:	W. S. Claypool, 1934
Number produced:	8
Models:	B and B2 (Radio Laboratory staff)
Frequency:	2300 kHz and 4600 kHz
Transmitter:	200 watts, 2 channel xtal, voice, AM, simplex
Receiver:	Hammurlund Comet Pro
Power:	Gas Engine alternator
Antenna:	Marine Marconi
Weight:	Unknown
Dimensions:	24 x 24 x 12" each
Principal use:	Ship to shore
*Comments	For use on Forest Service patrol boats in Region 10 only No schematic diagram available

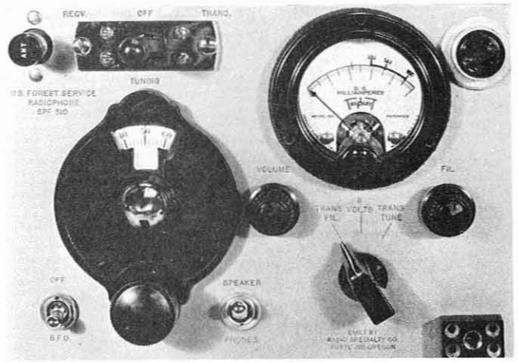


Type B2

(Forest Service photos, History Section)

Type SPF radio installed in carrying box; speaker, mike, and headset in hinged section on top.





Forest Service SPF radio, Model AA (Serial No. 310), front panel

Type SPF*	'Semiportable Fone'
Designed by:	W. S. Claypool and Laboratory staff, 1935-36
Number produced:	1200
Price:	$140
Models:	A,AA,AB(or BA),AD,AE,AF
Frequency:	3MHz
Transmitter:	2 1/4 watts, voice-c.w., AM, xtal
Receiver:	Superheterodyne, simplex
Power:	Dry batteries
Antenna:	Half-wave--off-center or end-fed
Weight:	21# w/lt. wt. battery, 60# w/Kitbox
Dimensions:	6 1/2 x 9 x 14 1/2"
Principal use:	Fire crews and emergency lookouts
*Comments:	PF modified with superheterodyne receiver

Model A Serial Numbers 1-264
Model AA Serial Numbers 265-480
Model AB Serial Numbers 481-743
Model AD Serial Numbers 744-903
Model AE Serial Numbers 904-966
Model AF Serial Numbers 967-1200
A number of additional SPF sets were produced by industry for the military during World War II (see text)

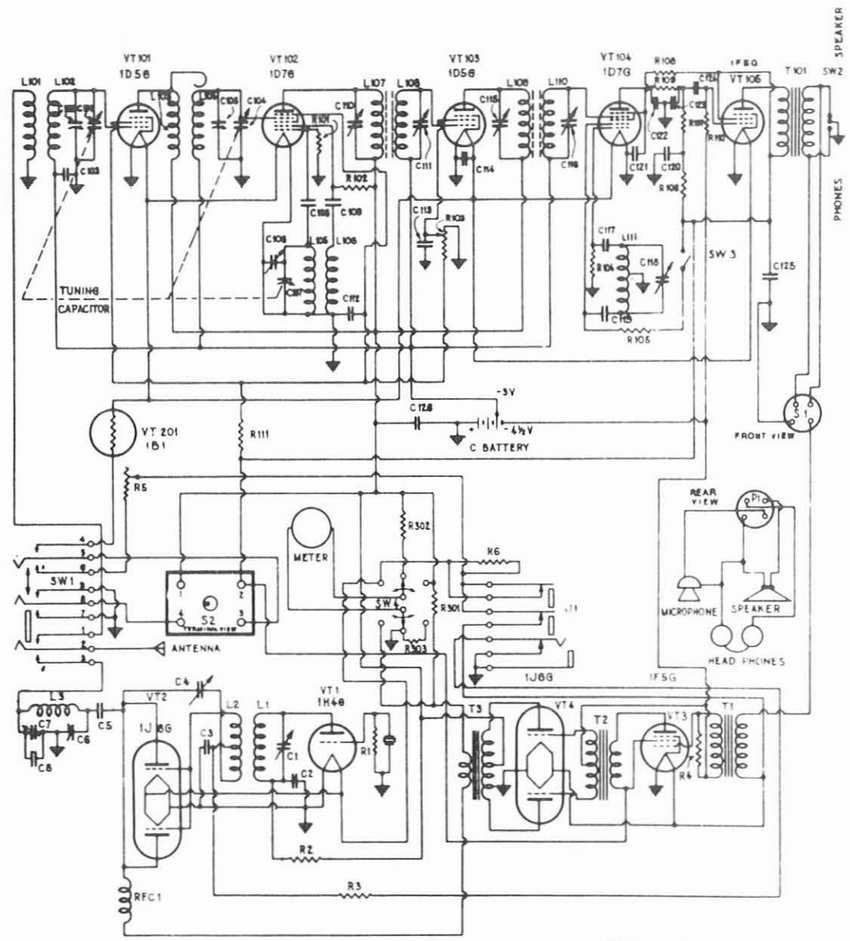
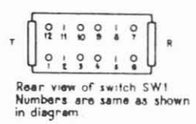


FIG. 2.62

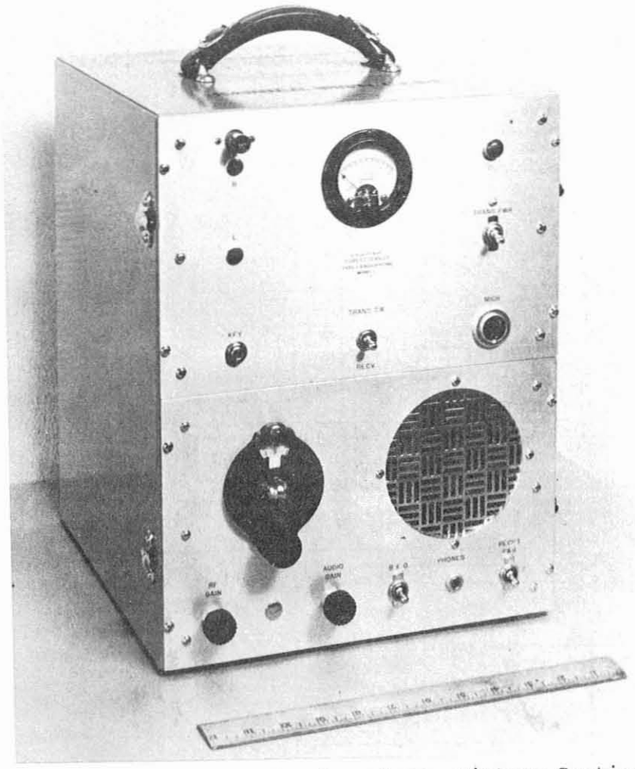


Rear view of switch SW1
Numbers are same as shown in diagram

BATTERY CABLE

1. Red = B+ 180
2. Green = B+ 135
3. Brown = A+
4. Blue = B-, Black = A-

Schematic Diagram, Type SPF-Model AA



(Forest Service photo, History Section)

Type I*

'Intermediate power'

Designed by:	Radio Laboratory staff, 1937
Number produced:	52
Prince:	$280
Models:	A, B, C (Belleville), D
Frequency:	3 MHz, two channel
Transmitter:	9 1/2 watts, voice-c.w., AM, xtal
Receiver:	Superheterodyne, simplex w/standby
Power:	6-volt storage battery
Antenna:	Half wave, fed off center
Weight:	66# w/accessories, including batteries
Dimensions:	17 1/2 x 19 1/4 x 12 1/4"
Principal use:	Fire camps and temporary bases
*Comments	Intermediate in power between SPF and M sets

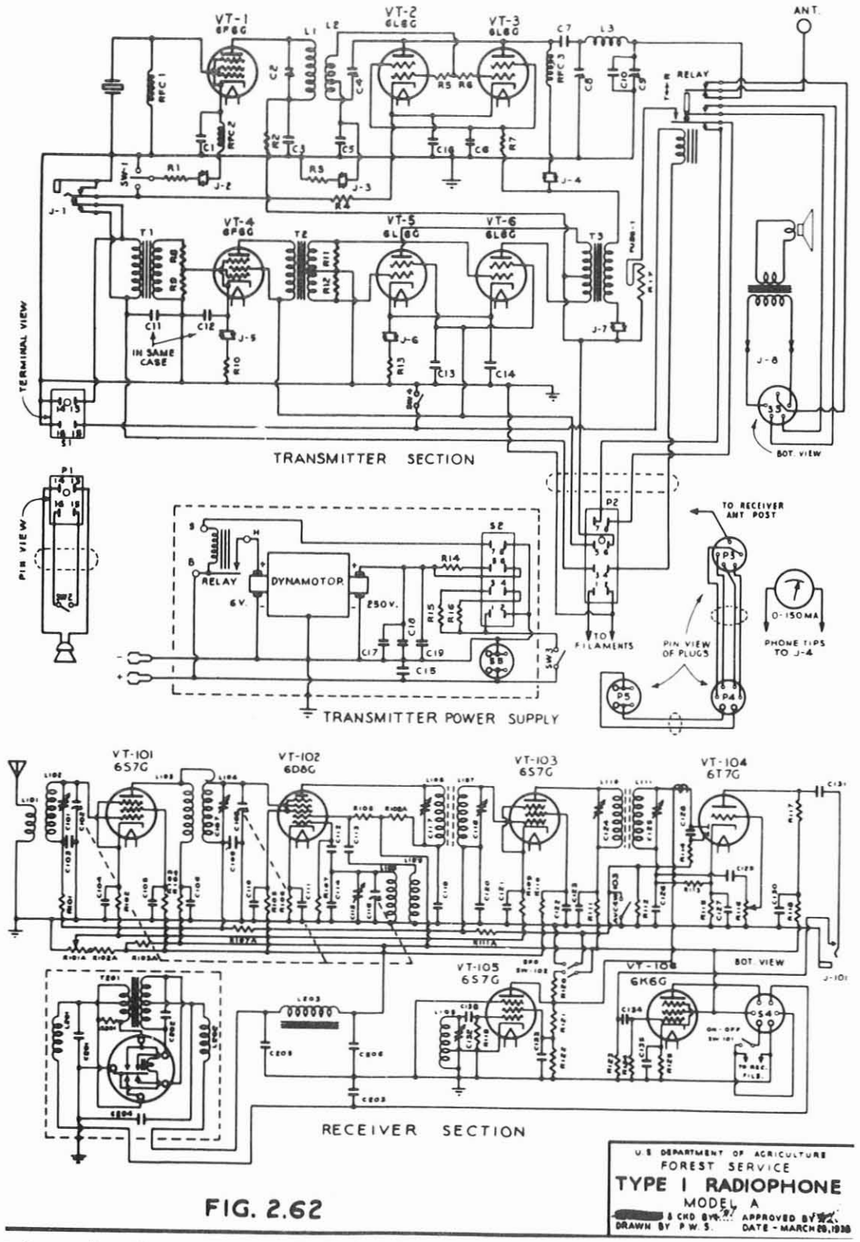
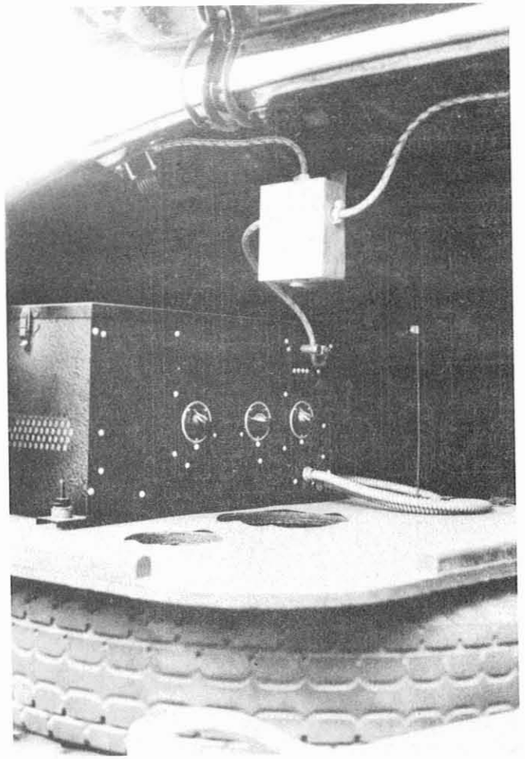
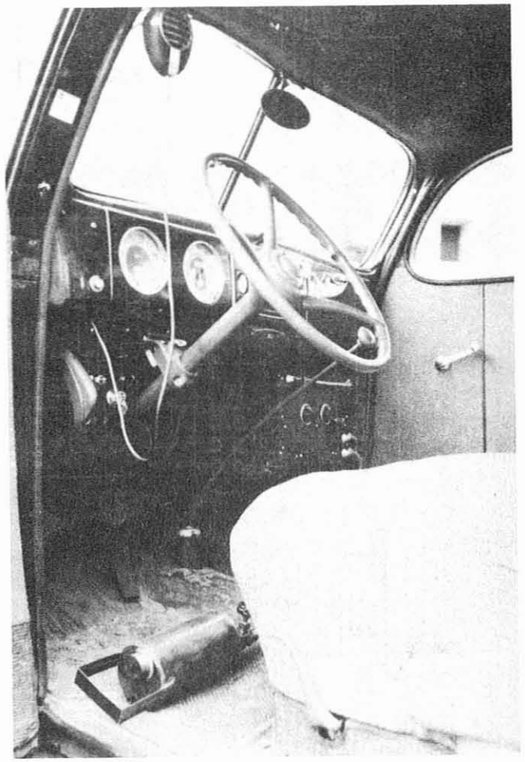


FIG. 2.62

Schematic Diagram, Type I-Model A



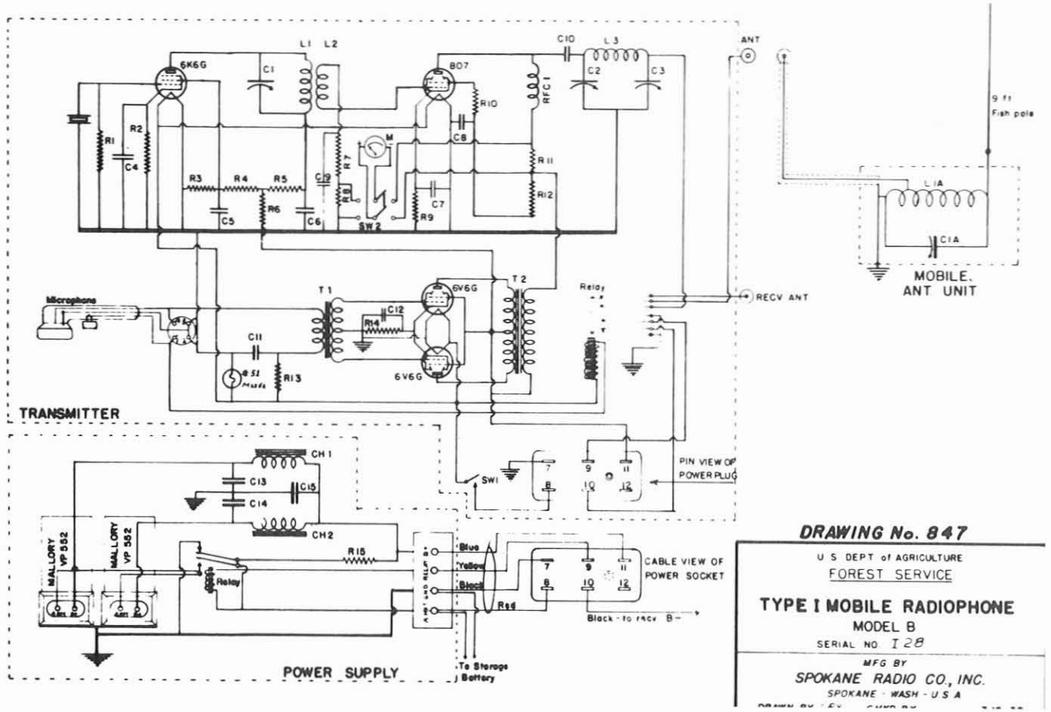


(Forest Service photos, History Section)

Type K*

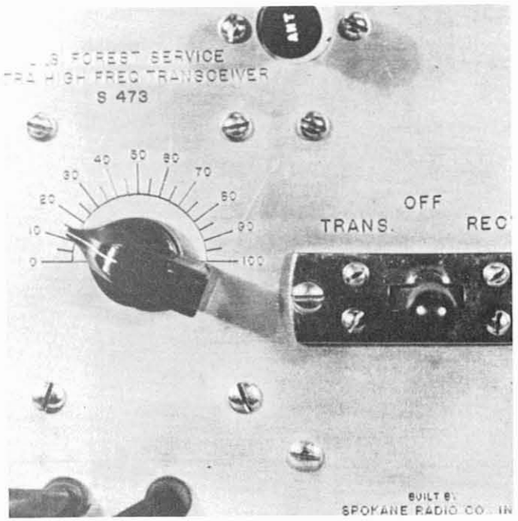
'Kar'

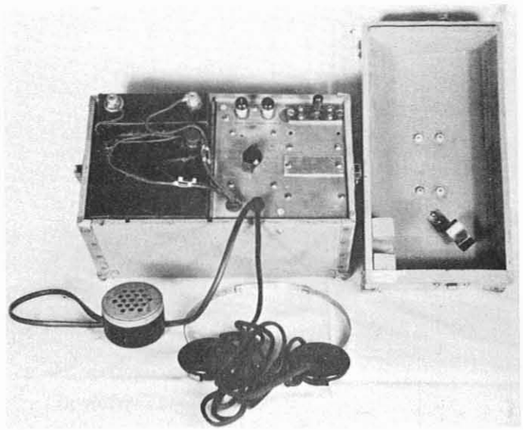
Designed by:	Radio Laboratory staff, 1937
Number produced:	63
Price:	$270
Models:	A, B, AA, AB*
Frequency:	3 MHz
Transmitter:	9 1/2 watts, voice, AM, xtal
Receiver:	Motorola Police Cruiser (AA-AB), pushbutton
Power:	6-volt car battery
Antenna:	Rod type on tuning box
Dimensions:	Four packages
Principal use:	Mobile
*Comments:	Originally designated Type I-mobile (A and B) Type KA ('Kar-Airplane') was for airplane use



Schematic Diagram, Type K (Type I-Mobile)

Vhf Types
10 Meters (30–40 MHz)





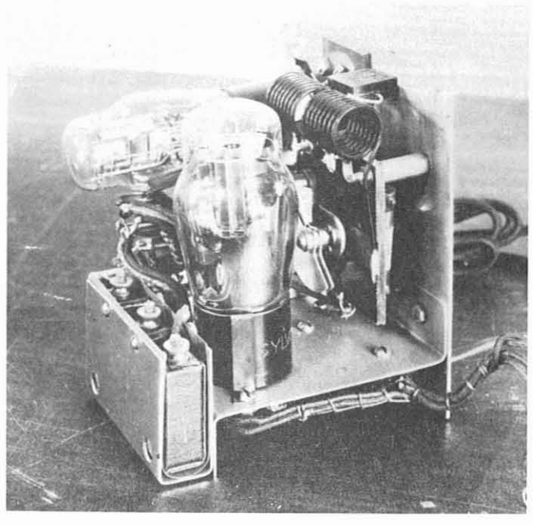
(Forest Service photos, History Section)

Type S*

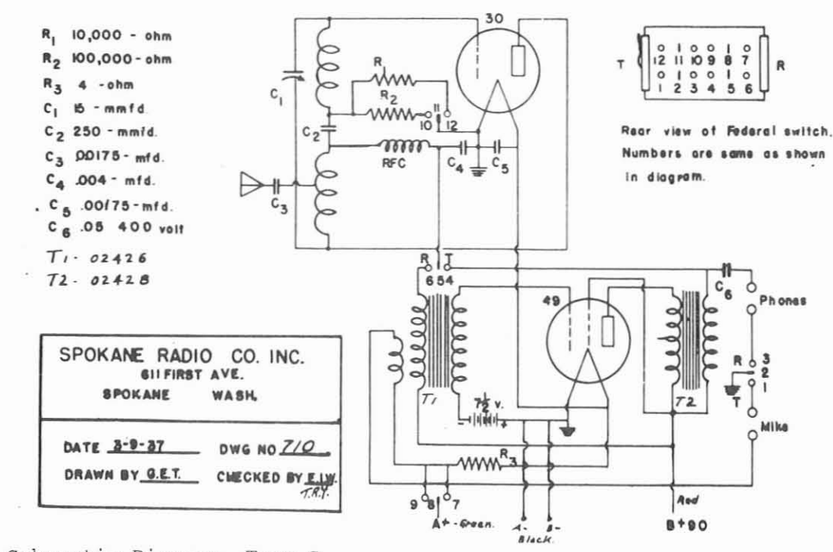
'Superregenerative'

Designed by:	Harold K. Lawson, 1935
Number produced:	781
Price:	$47
Models:	A, B*
Frequency:	30-40 MHz
Transmitter:	1/10 watt, voice, AM self-excited oscillator, simplex, transceiver
Receiver:	Superregenerative, tunable
Power:	Dry batteries
Antenna:	14' 7" half wave wire or rod type
Dimensions:	7 x 6 x 11"
Weight:	9# w/batteries
Principal use:	Smokechasers, scouts and fire chiefs; occasionally with moving vehicles
*Comments:	Offset transmitter-receiver frequencies Model B added separate transmitter tuning control and slightly more power Often criticized for spurious signals

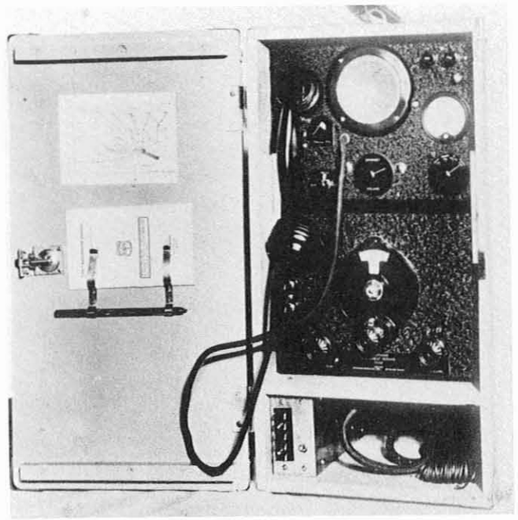
Interior view,
Type S

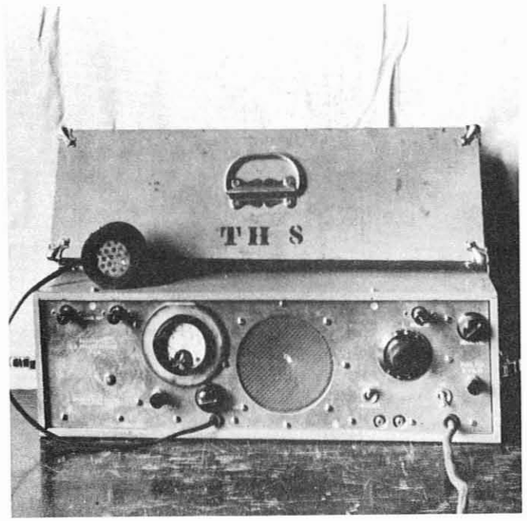


(Forest Service photo, History Section)



Schematic Diagram, Type S





(Forest Service photos, History Section)

Type T*

'Ten meters'

Designed by:	W. Foy Squibb, 1935
Number produced:	Numbers included with T-D
Price:	$130
Models:	TH-TL; CA, CB, CC
Frequency:	30-40 MHz
Transmitter:	2 1/4 watts, voice, AM, standby, master oscillator
Receiver:	National SW-3; superregenerative
Power:	Dry batteries
Antenna:	Half wave doublet
Dimensions:	22 x 15 x 19"
Weight:	29# including batteries and antenna
Principal use:	Lookouts and semi-permanent locations
*Comments:	Spurious signals in receiver led to TH-TL for the separation of transmitter-receiver channels, thus H is High and L is Low frequency Model CC operated simplex; CA and CB duplex Provisions to connect to telephone line Required 2 frequency assignments for each National Forest No relationship to Type T-Model D

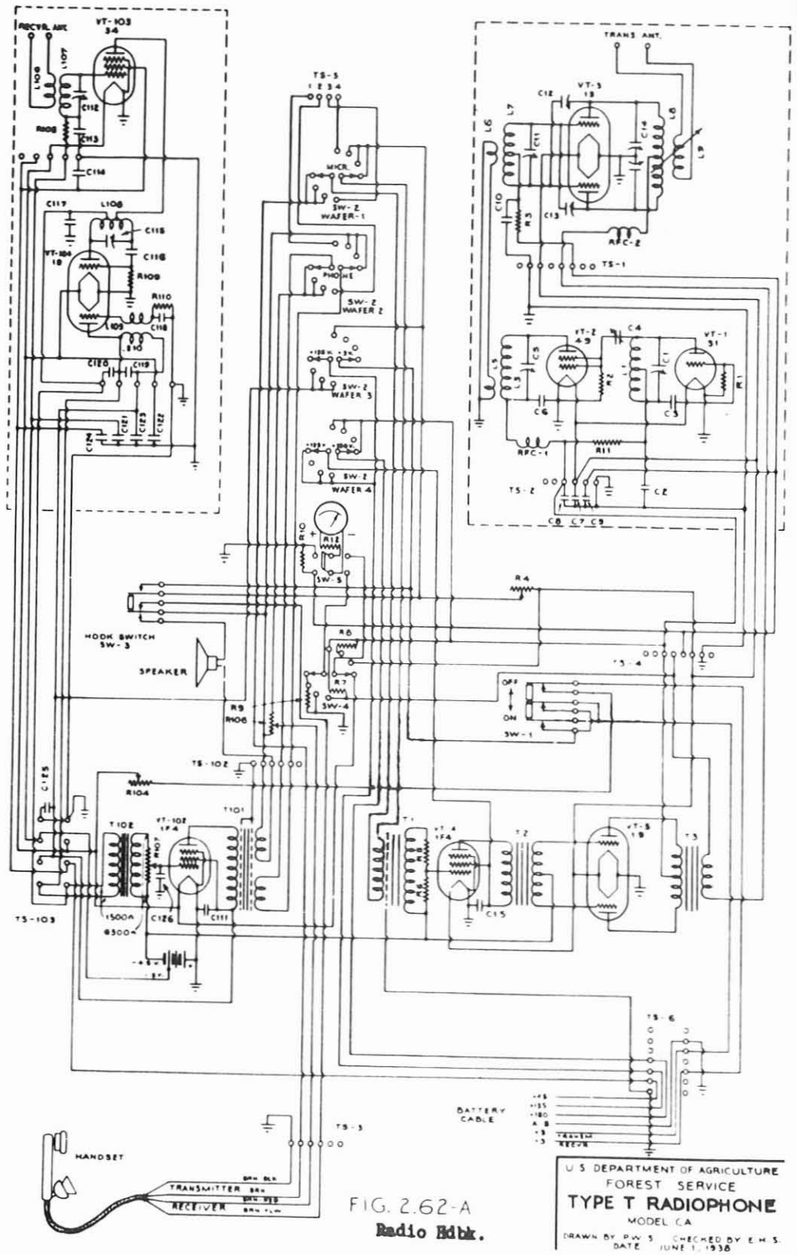
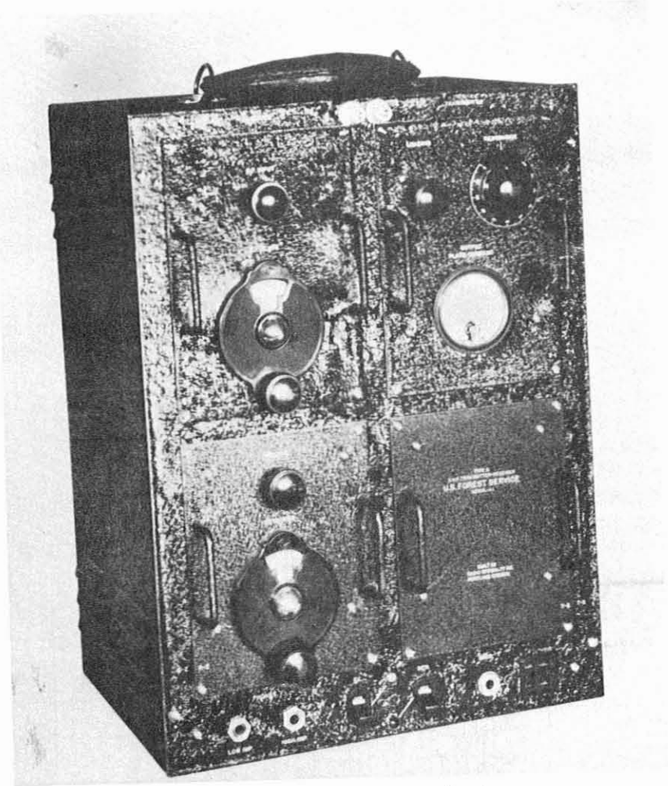


FIG. 2.62-A
Radio Hdbk.

Schematic Diagram, Type T



(Forest Service photo, History Section)

Type A*

'Airplane'

Designed by:	Radio Laboratory staff, 1936
Number produced:	50
Price:	$260
Frequency:	30-40 MHz, w/second channel 160-425 kHz
Transmitter:	3 1/2 watts, voice, AM, xtal push-to-talk
Receiver:	Regenerative, w/tuning
Power:	6-volt battery
Antenna:	13' half wave doublet
Weight:	25#, or 40# w/dynamotor
Dimensions:	18 x 13 x 10 1/2"
Principal use:	Air to ground
*Comments	Advertised 5-mile range in unshielded airplane Could be used with moving vehicles

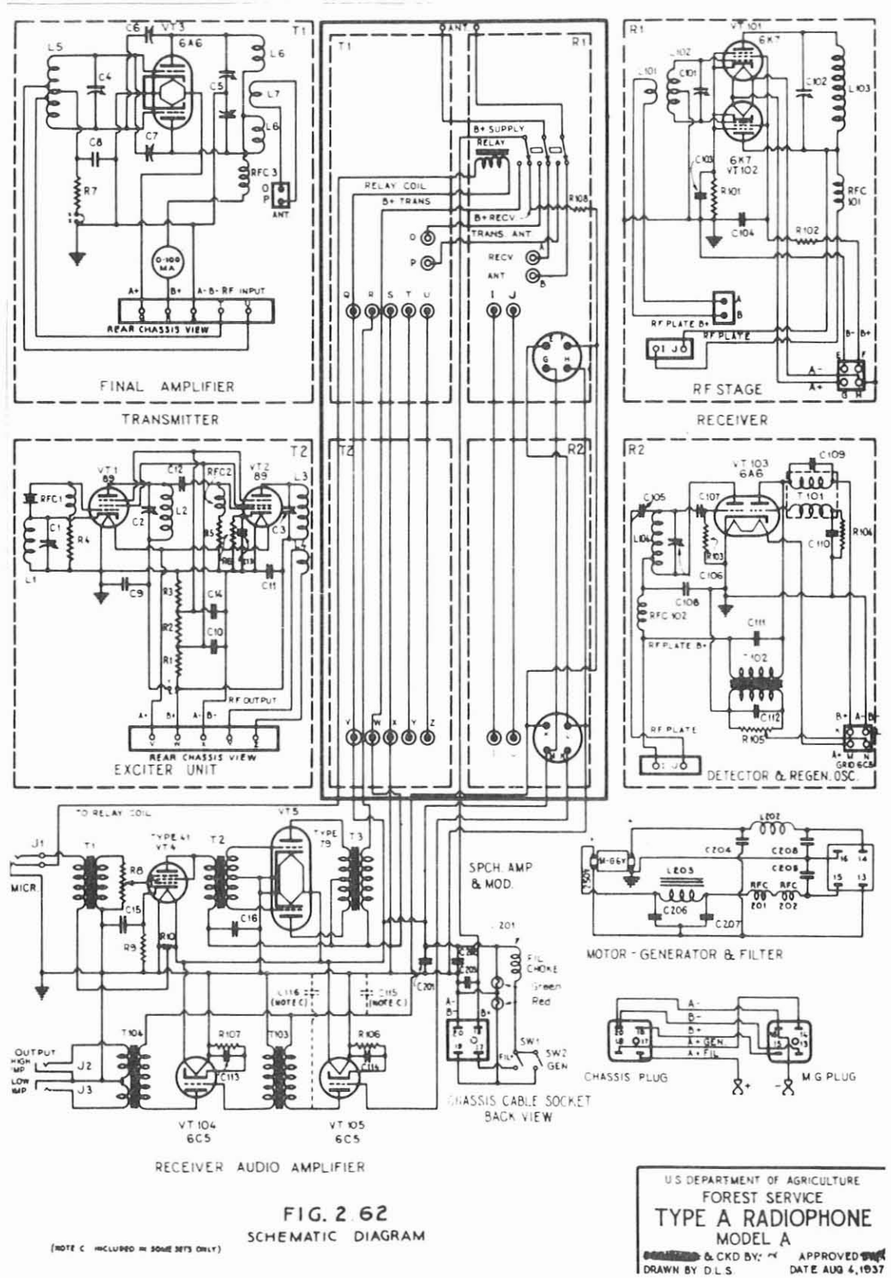
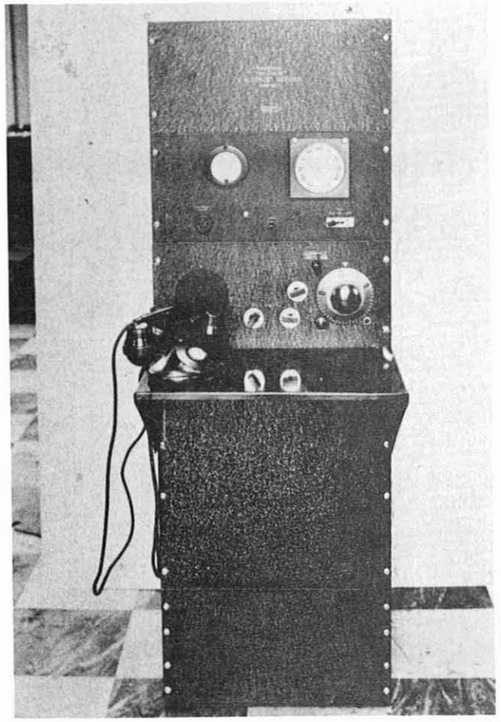


FIG. 2.62
SCHEMATIC DIAGRAM

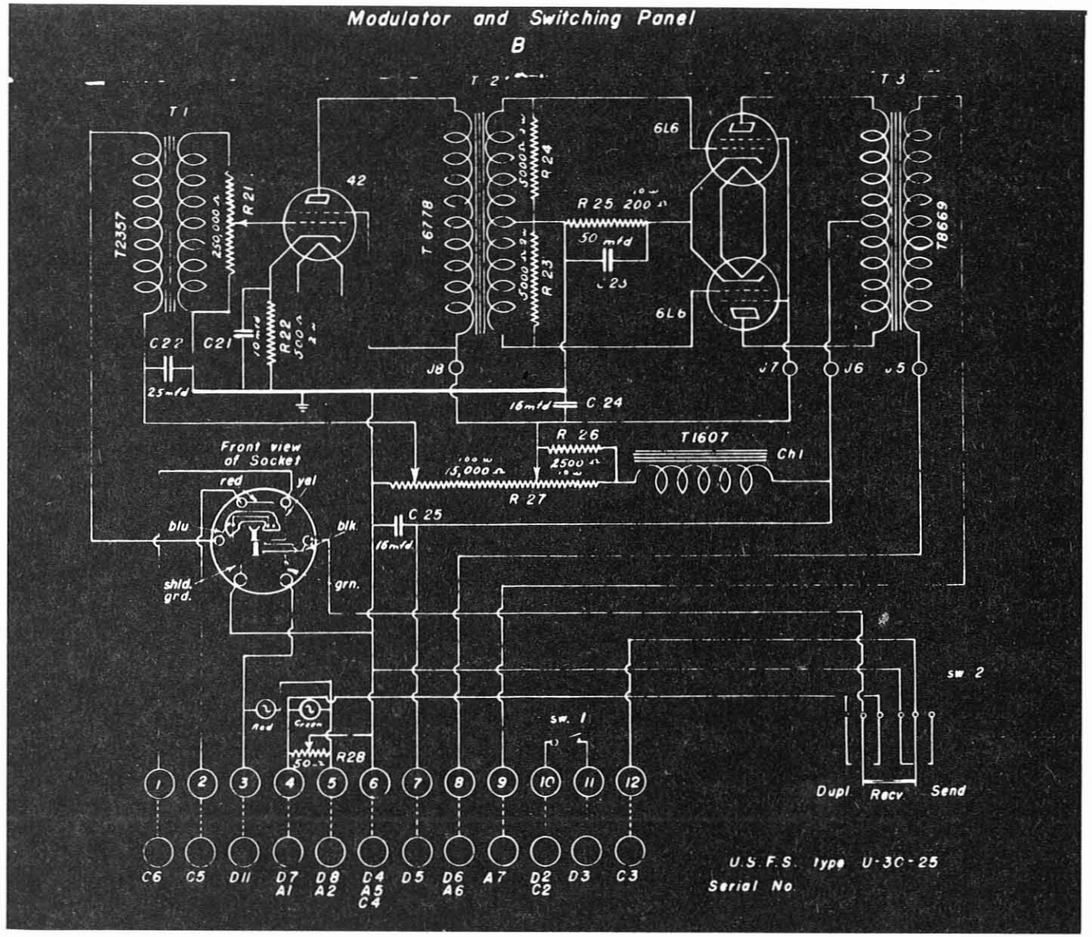


(Forest Service photo, History Section)

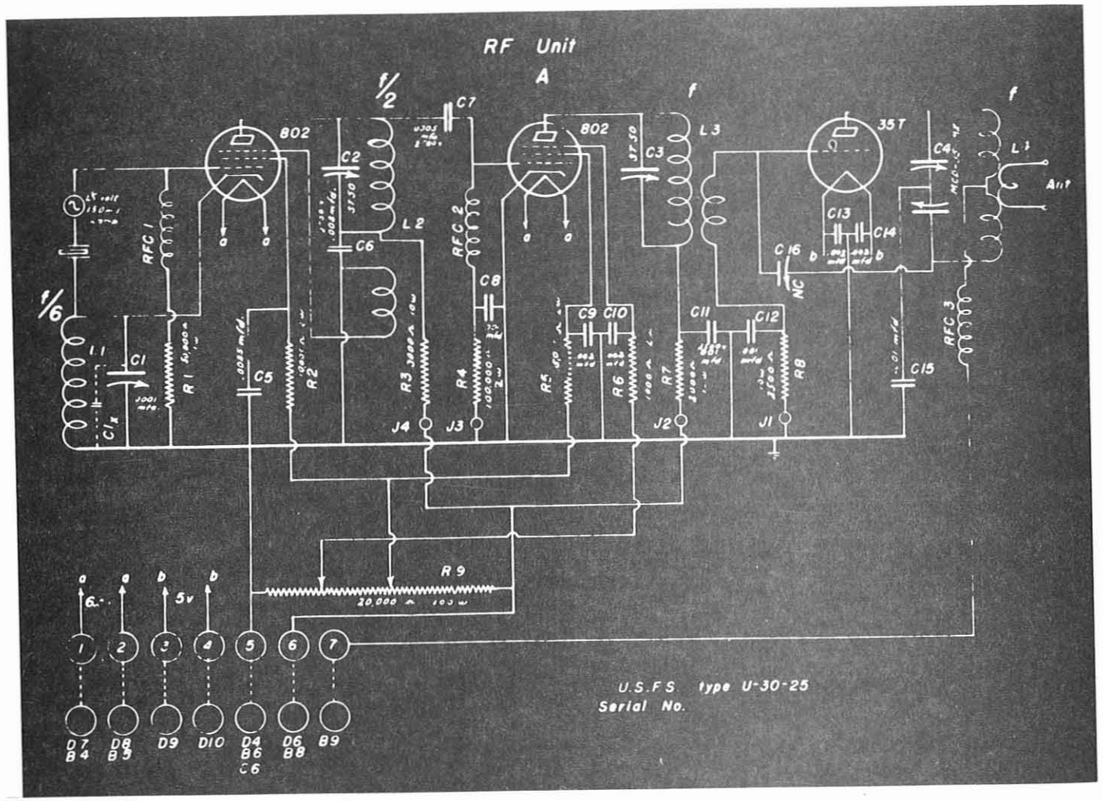
Type U*

'UHF'

Designed by:	Logan Belleville, 1936
Number designed:	200
Price:	$400
Models:	A
Frequency:	30-40 MHz
Transmitter:	20 watts, voice, AM, simplex
Receiver:	National superregenerative
Power:	110 volts (a.c.)
Antenna:	Constructed at locations
Dimensions:	4'9" x 19" x 12"
Weight	300# (shipping weight)
Principal use:	Central station, fixed base
*Comments:	Speaker on standby, transmitter turned on by lifting handset from cradle No relationship to U-R/U-T series



Schematic Diagram, Modulator and Switching Panel, Type U



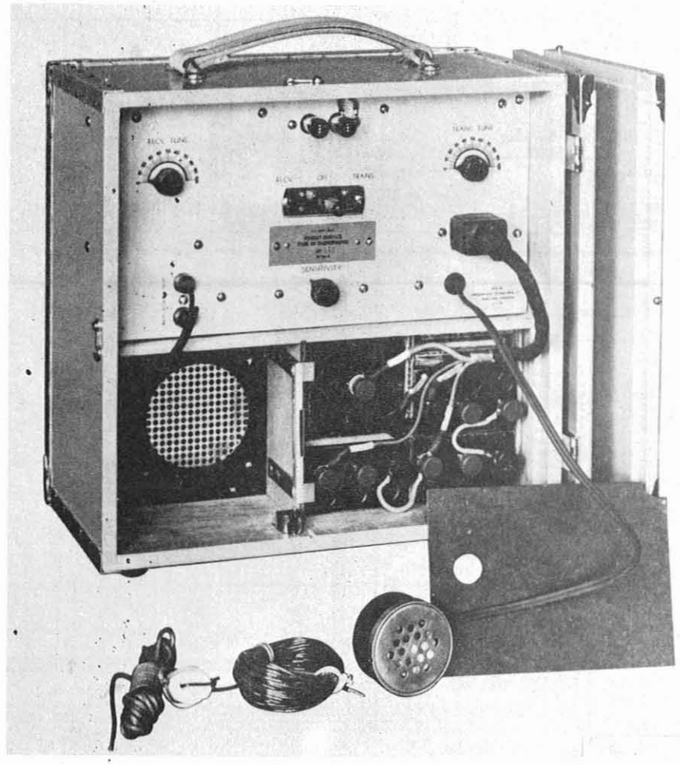
Schematic Diagram, RF Unit, Type U

Type SV*

'Superregenerative Variable' Frequency

Designed by:	Radio Laboratory staff, 1937-38
Number produced:	330
Price:	$61
Frequency:	30-40 MHz
Transmitter	1 watt, voice, AM, simplex, self-oscillating
Receiver:	Superregenerative
Power:	Dry batteries
Antenna:	Three-quarter wave, single wire
Dimensions:	6 x 10 x 5" or 12 x 12 x 7" overall
Weight:	18#
Principal use:	Where extreme portability was not essential
*Comments:	Independent transmitter/receiver sections

(Forest Service photo, History Section, 15472)



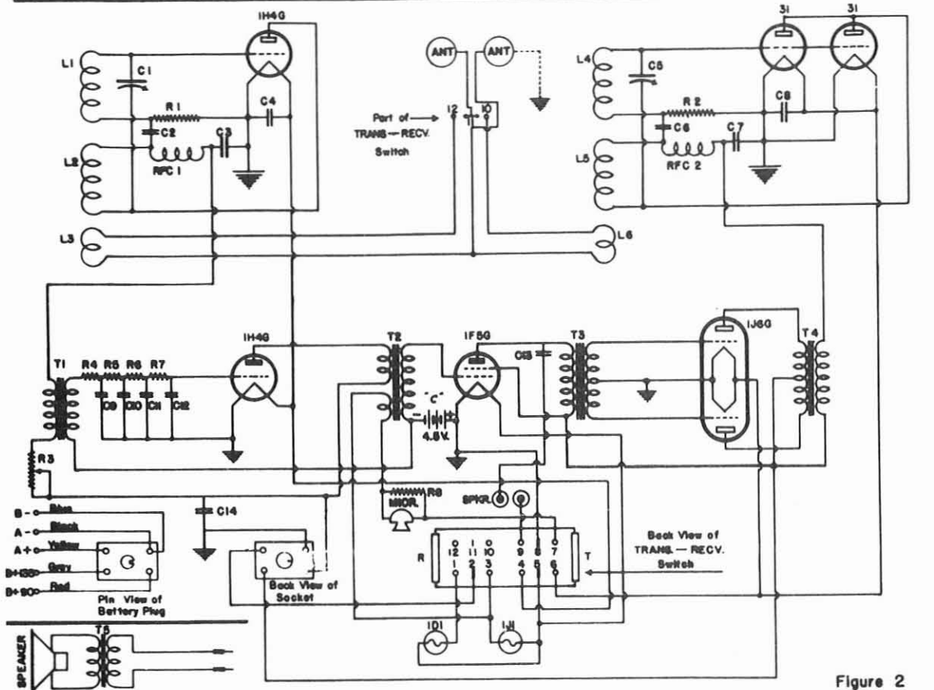


Figure 2

TYPE SV PARTS LIST

WHEN ORDERING REPLACEMENT PARTS, ALWAYS GIVE MODEL AND SERIAL NUMBER

C 1 - 16 mmf. Special Hammarlund
C 2 - .001 mfd. mica C-D 1B-5D1
C 3 - .003 mfd. mica C-D 1B-5D3
C 4 - .0015 mfd. mica C-D 1B-5D15
C 5 - 22 mmf. Special Hammarlund
C 6 - .00025 mfd. mica C-D 5B-5T25LL
C 7 - .002 mfd. mica C-D 1B-5D2
C 8 - .002 mfd. mica C-D 1B-5D2
C 9 - .0001 mfd. mica C-D 5B-5T1
C10 - .0001 mfd. mica C-D 5B-5T1
C11 - .0001 mfd. mica C-D 5B-5T1
C12 - .0001 mfd. mica C-D 5B-5T1
C13 - .25 mfd. 400 V. Mallory TF430
C14 - .25 mfd. 200 V. Mallory TF440
R 1 - 75000 ohms, ½ W. IRC BT-½
R 2 - 10000 ohms, 1 W. IRC BT-1
R 3 - 100000 ohms, Var. IRC 11-12B
R 4 - 100000 ohms ½ W. IRC BT-½
R 5 - 100000 ohms ½ W. IRC BT-½
R 6 - 100000 ohms ½ W. IRC BT-½
R 7 - 100000 ohms ½ W. IRC BT-½
R 8 - 100 ohms, ½ W. IRC BW-½
T 1 - Inca 02425
T 2 - Inca 02426
T 3 - Inca 04792
T 4 - Inca 06066
T 5 - Oxford #21A162
Speaker - Oxford # 3-AMF
RFC-1 5 meter choke - COTO CI-13
RFC-2 5 meter choke - COTO CI-13
Battery Plug - Jones PM5, plug only
Battery Socket - Jones P85 socket
Speaker Jack - Yaxley 432
ANT. posts - I-L Push type
TRANS.-RECV. Switch - Federal 1422B
"C" Battery - General H-3-AF

A complete stock of parts and accessories is maintained in Spokane, Washington by the Spokane Radio Co., Inc., manufacturer of this set.

SPOKANE RADIO CO., INC.
MFG. DEPT.
SPOKANE, WASH. U. S. A.
Drawing by T.R.Y. Date 5/7/38
Checked by P.D.C.

DRAWING NO. 861

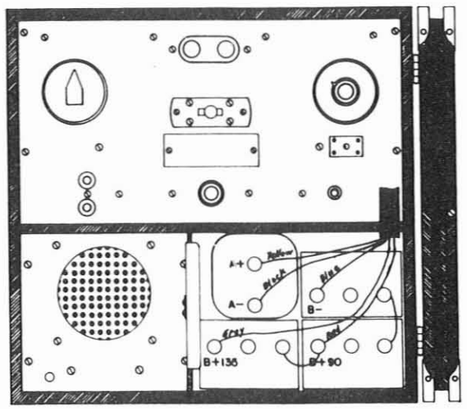
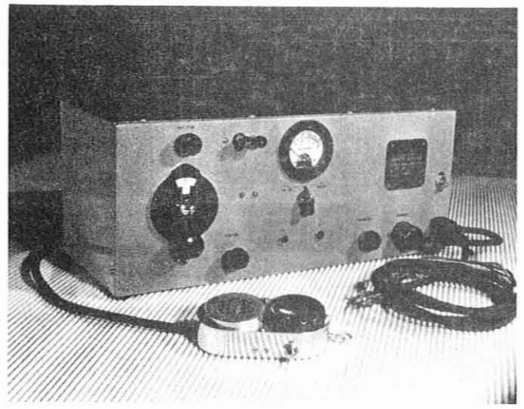


Figure 1

Schematic Diagram, Type SV-Model A



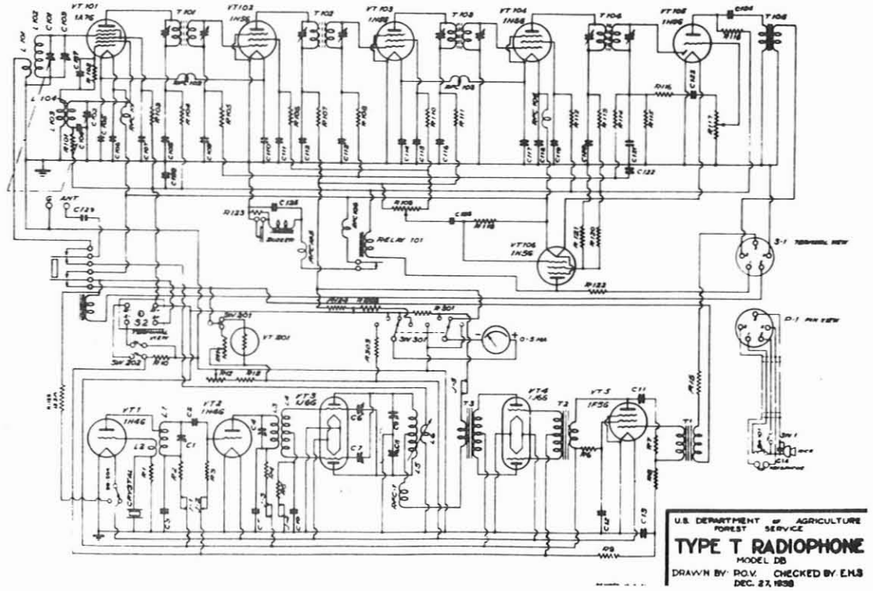
(Forest Service photo, History Section)

Type T-Model D*

'Ten meter'

Designed by:	Logan M. Belleville, 1938
Number produced:	630
Price:	$250
Models:	D, DA, DB, DE, DF
Frequency:	30-40 MHz
Transmitter:	2 watts, voice, AM, push-to-talk, simplex, xtal osc.
Receiver:	Superheterodyne, silent standby
Power:	Dry batteries
Antenna:	USFS Type J or RSMC coaxial skirt dipole
Dimensions:	7 x 17 x 7"
Weight:	30# in shipping case, including batteries
Principal use:	Lookouts
*Comments:	No relationship to earlier type T Incorporated a calling bell

Schematic Diagram, Type T-Model DB



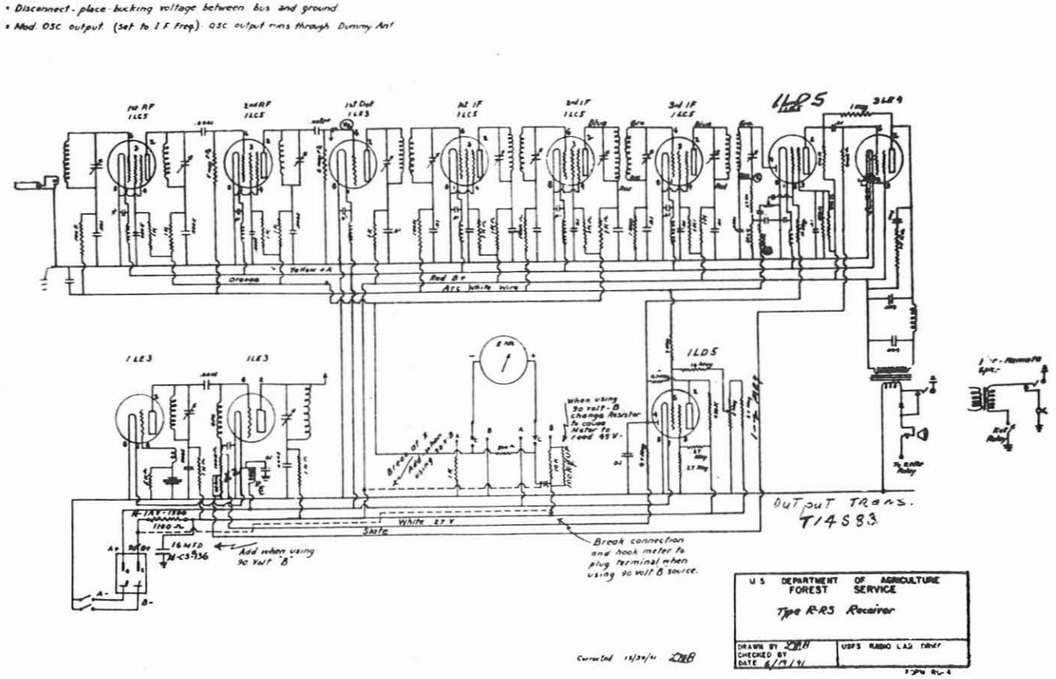
(Forest Service photo, History Section)

Type RRS*

'Relay Repeater Station'

Designed by:	Radio Laboratory staff, 1939-40
Number produced:	470
Models:	RA, RB, RD, RF, RG, R-DR, R-D6T, R-D2T, TRT-F7, R-RS-16
Frequency:	30-40MHz
Principal use:	Relay repeater stations Used extensively in AWS program Some use in lookout towers as a receiver
*Comments:	Specifications varied by model

Schematic Diagram, Type RRS Receiver

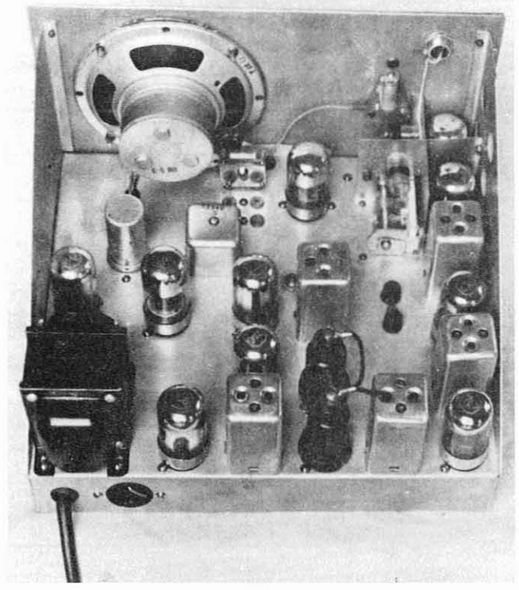


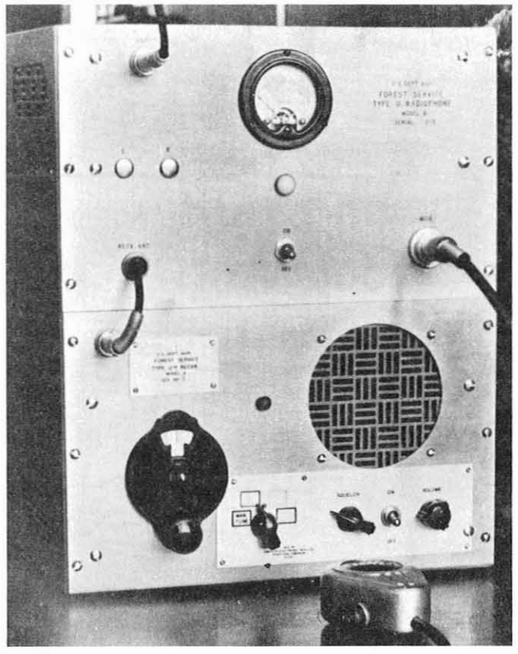
Type KU*

'Kar UHF'

Designed by:	Logan M. Belleville, 1940
Number produced:	575
Price:	$270
Models:	R-A; T-A, T-AA, T2; A, B in Type U
Frequency:	30-40 MHz
Transmitter:	9 watts, voice, AM, simplex, xtal controlled
Receiver:	Tunable w/single xtal standby
Power:	6-volt vehicle battery
Antenna:	Quarter-wave whip
Dimensions:	Housed in several units (see figure 74 and text)
Principal use:	Mobile
*Comments:	Converted to semiportable for lookout use and designated U-R/U-T Effective squelch and essentially free of ignition interference No relationship to earlier type U

Type U-R/U-T*
(Forest Service photos, History Section)





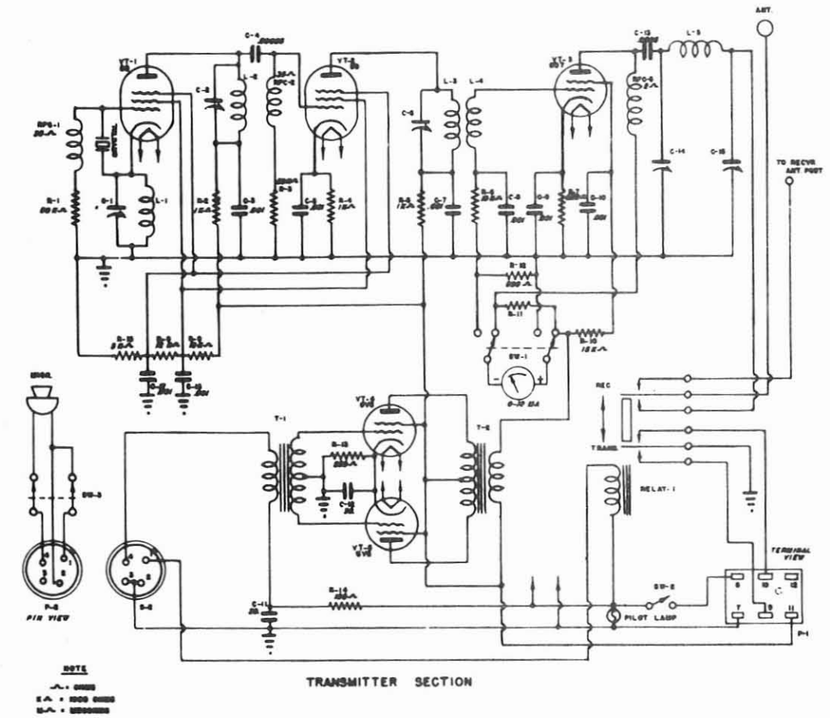
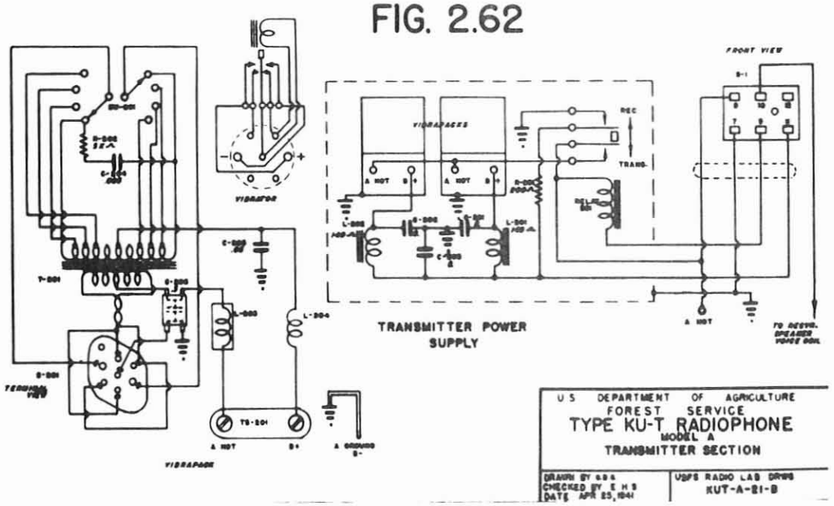


FIG. 2.62



Schematic Drawing, Type KU-T, Model A, Transmitter

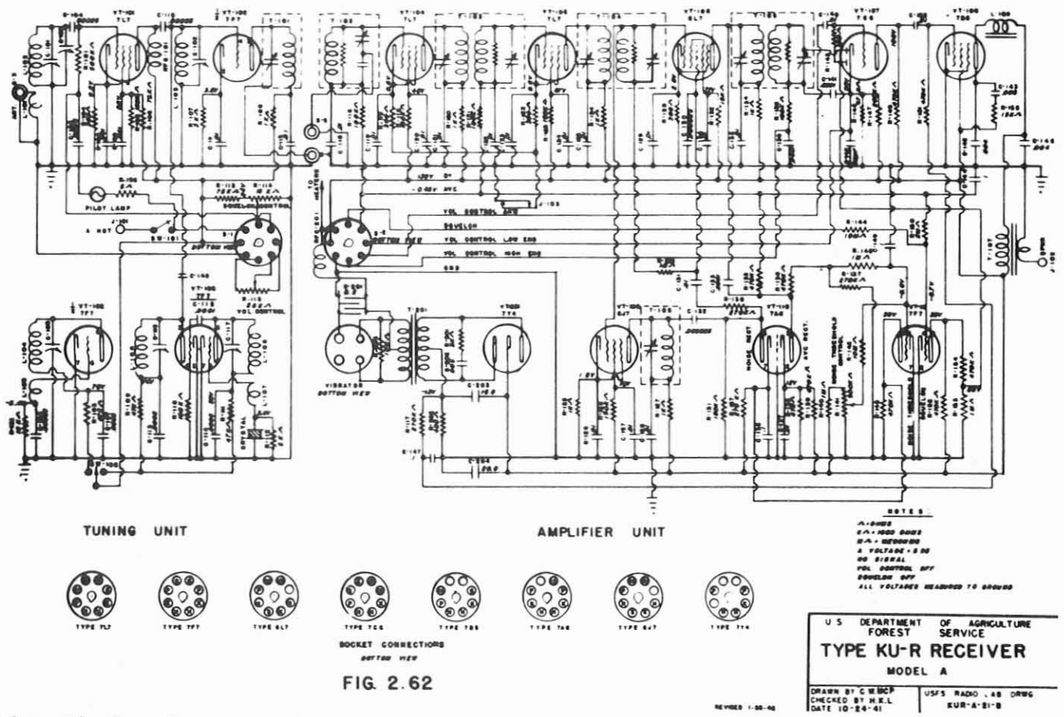


FIG. 2.62

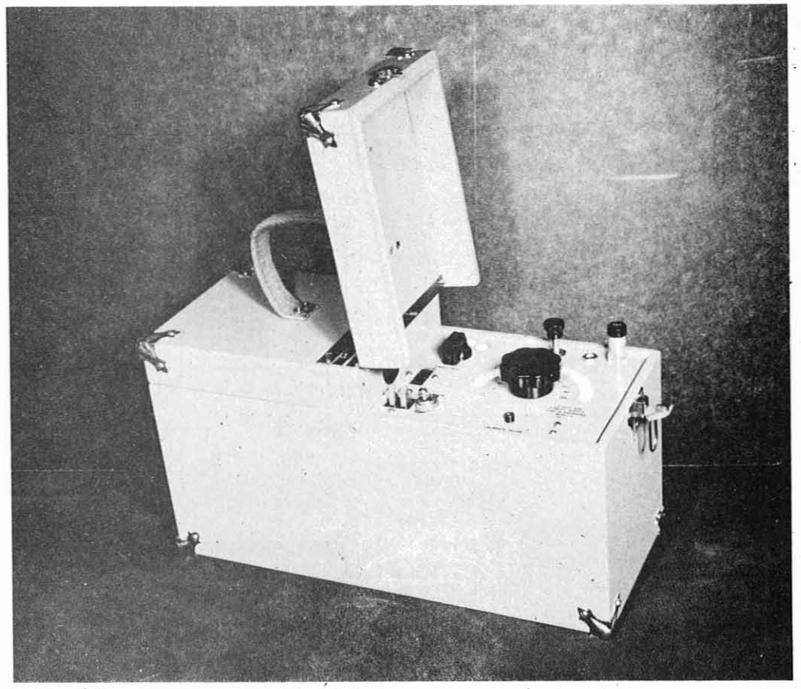
Schematic Drawing, Type KU-R, Model A, Receiver

Type SX*/SJ*

'Superregenerative Xtals/Smoke Jumper'

Designed by:	Radio Laboratory staff, 1940-41 (SX/SJ)
Number produced:	800/22
Price:	$70/not available
Frequency:	30-40 MHz/34.22 MHz only
Transmitter:	1/4 watt, voice, AM, 3 xtals/1 xtal
Receiver:	Superregenerative
Power:	Dry batteries/6-10 hrs. intermittant operation
Antenna:	Type J/rod type
Weight:	6# 14 oz. net/n.a.
Dimensions:	13 1/2 x 5 1/2 x 7"/n.a.
Principal use:	Portable/smokejumpers
Comments:	SJ was a condensed version of the SX (see figures 75, 76) SXA ("A" for attachment) was an audio amplifier accessory for semiportable use and added $45 to the price of the SX SX replaced type S; SXA replaced type SV

(NA:95G-406995)



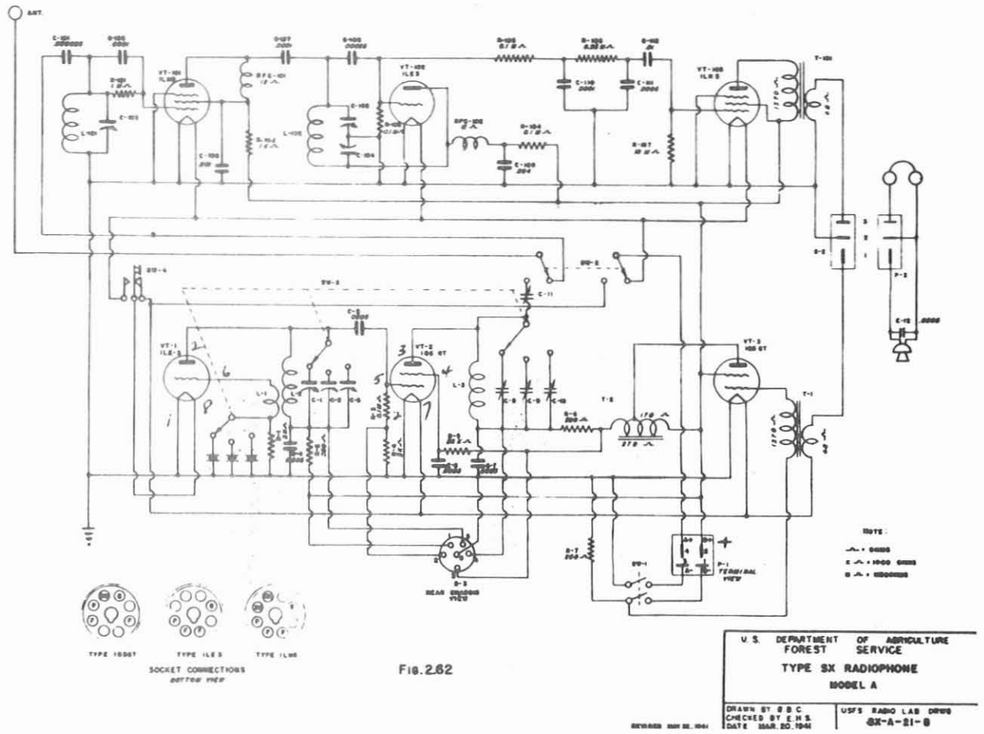


Fig. 2.62

Schematic Drawing, Type SX-Model A

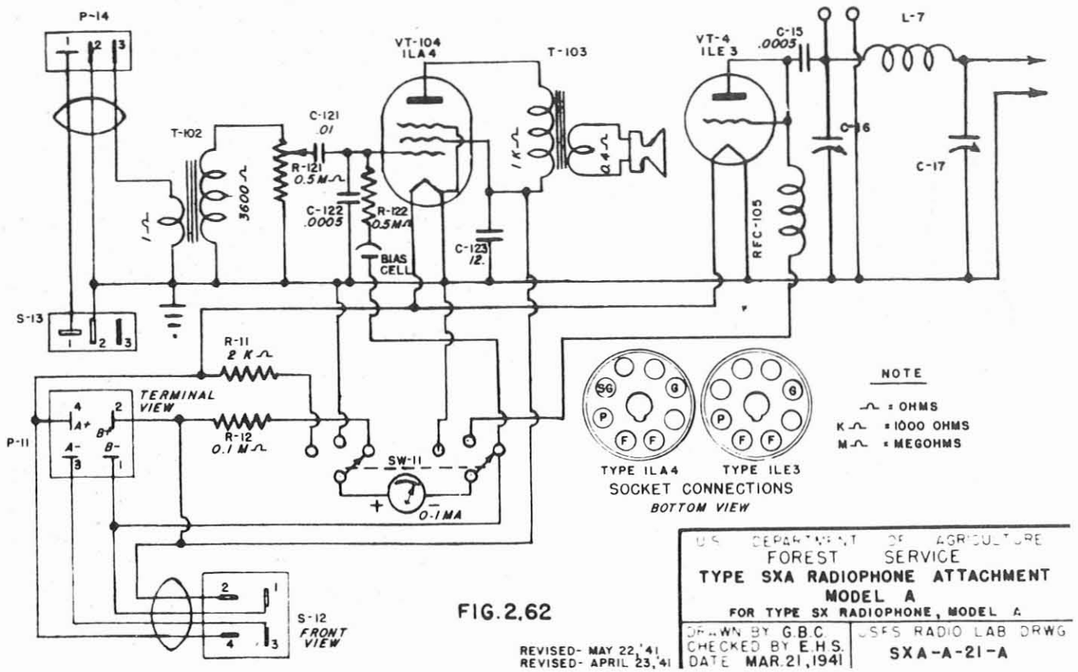
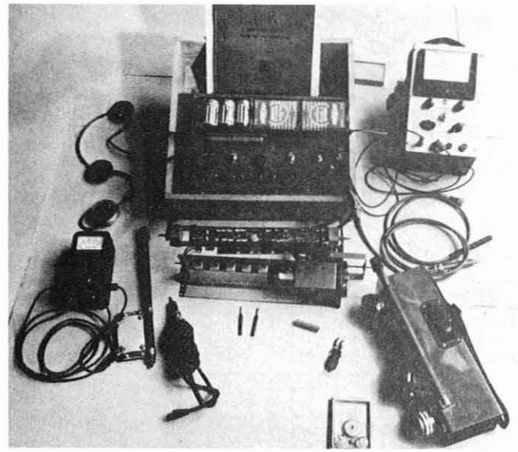


FIG.2.62

Schematic Drawing, Type SXA-Model A

Vhf Types — FM



(Forest Service photo, History Section)

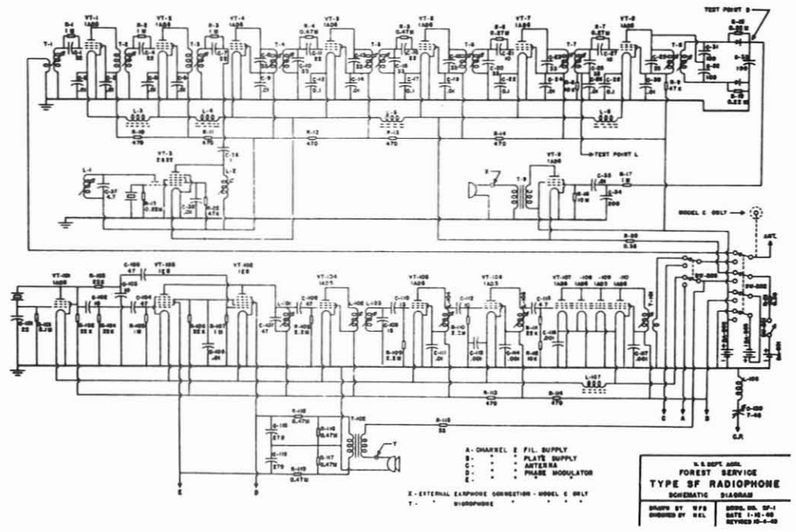
Type SF*

Handie-Talkie with kitbox

Designed by:	Logan M. Belleville, 1947
Number produced:	200+
Price:	Not available
Models:	A-T2-R, B-2, C
Frequency:	30-40 MHz
Transmitter:	200 mw, dual channel, FM
Receiver:	Superheterodyne, 1 channel
Power:	Dry batteries
Antenna:	7' collapsible rod
Dimensions:	4 x 6 x 14"
Weight:	9# w/batteries
Principal use:	Smokechasers and fire scouts

*Comments: Related to type S only in manner of use ("F" for FM) Latter versions included telephone handset as part of carrying handle. A unit with earphones and sensitive microphone was produced for communications with airplanes.

Schematic Diagram, Type SF

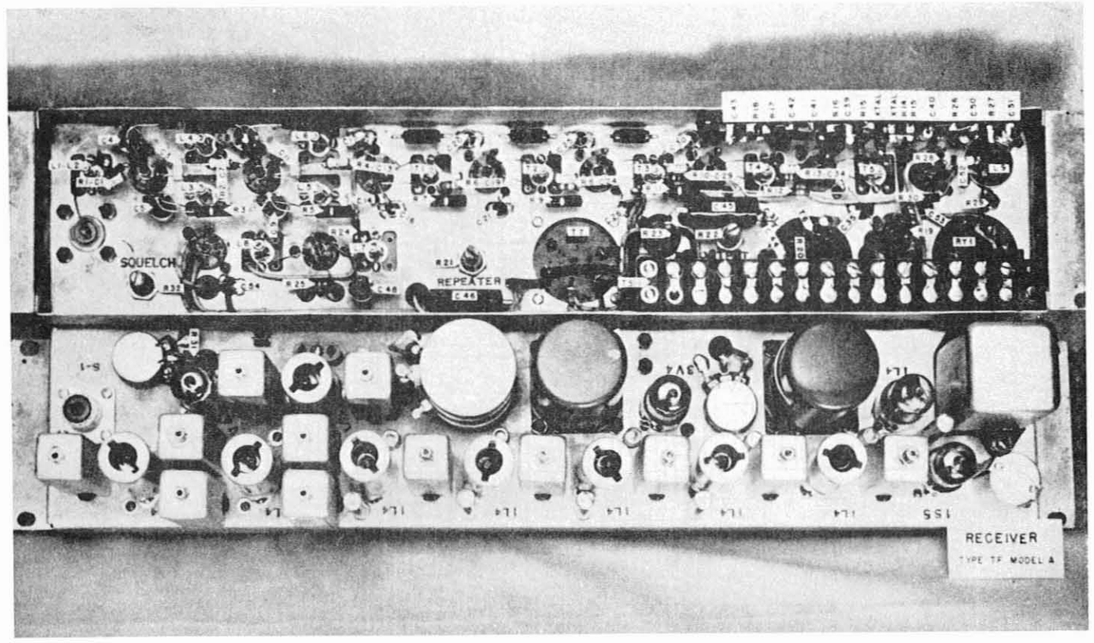


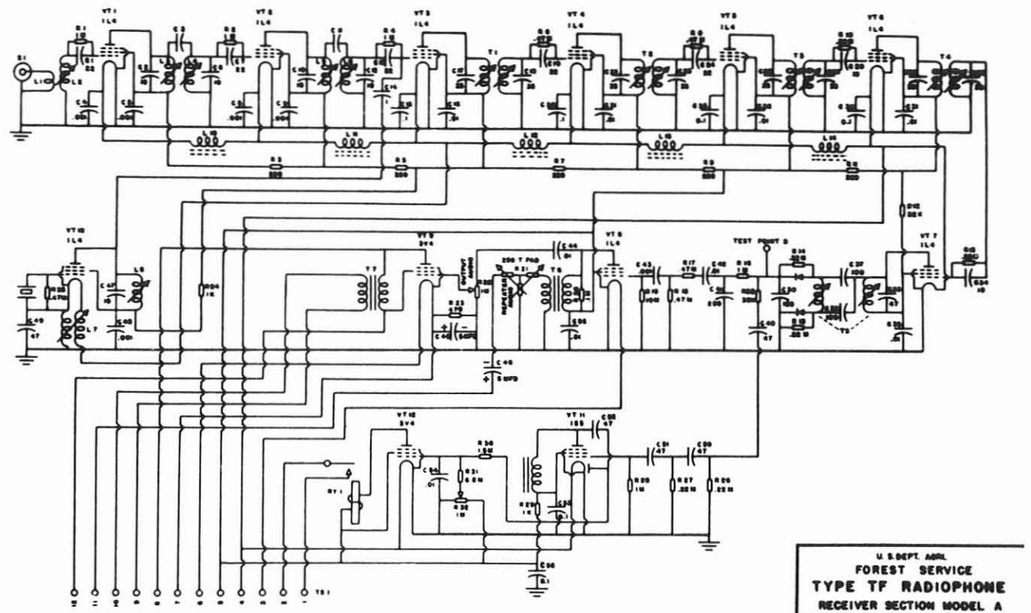
Type TF*

Lookout FM

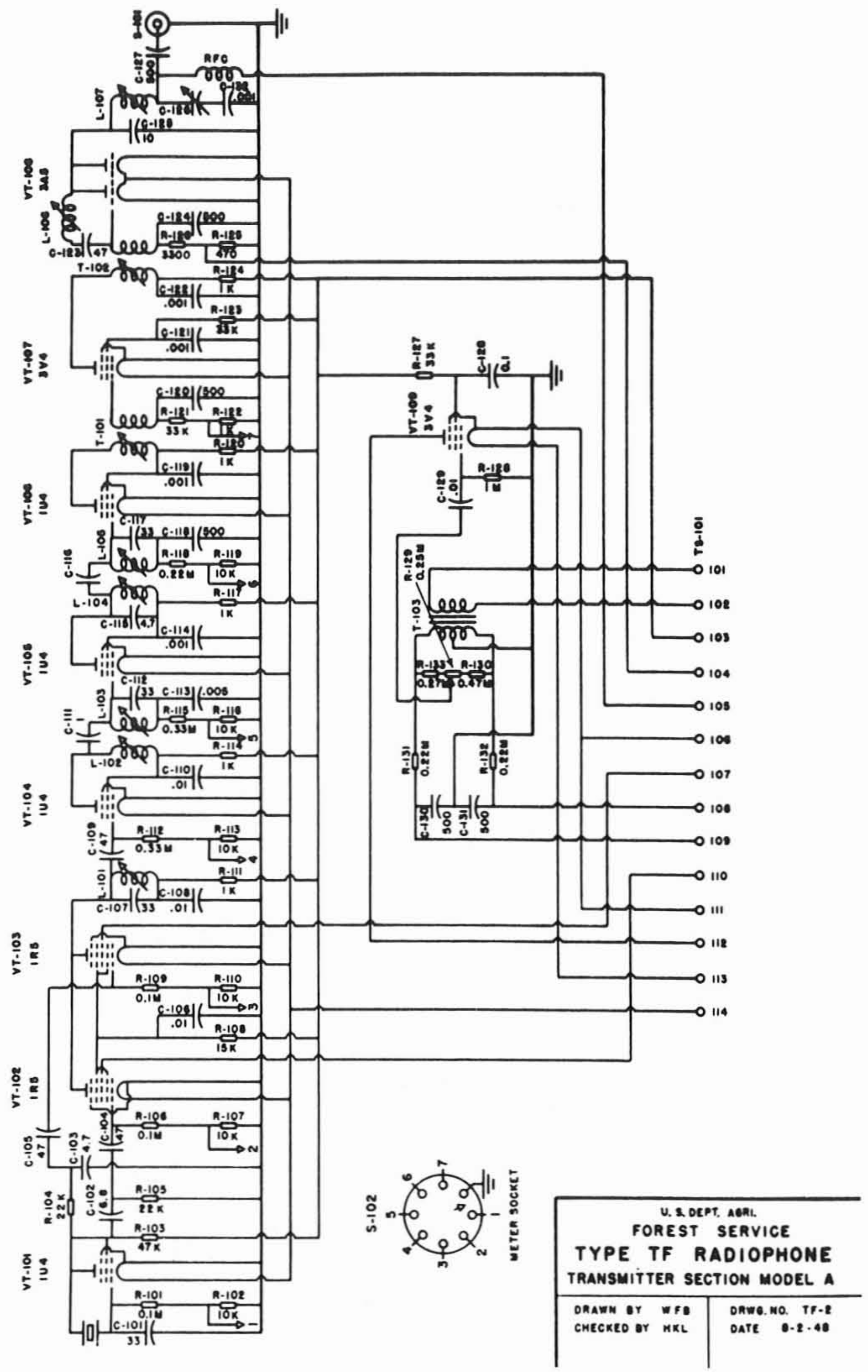
Designed by:	Radio Laboratory staff, 1947-48
Number produced:	Not available
Price:	Not available
Frequency:	30-40 MHz
Transmitter:	2 watts, 2 channel xtal, voice, FM, duplex
Receiver:	Superheterodyne single channel
Power:	Dry batteries
Antenna:	Coaxial or GP
Dimensions:	13 x 10 x 26" plus battery box
Weight:	60# w/control unit
Principal use:	Lookouts
*Comments	2 antennas required for all sets to be used as automatic repeaters Main circuitry remotely located in magnesium cast weatherproof enclosure Receiver only is pictured

(Forest Service photo, History Section)





Schematic Diagram, Type TF-Model A, Receiver

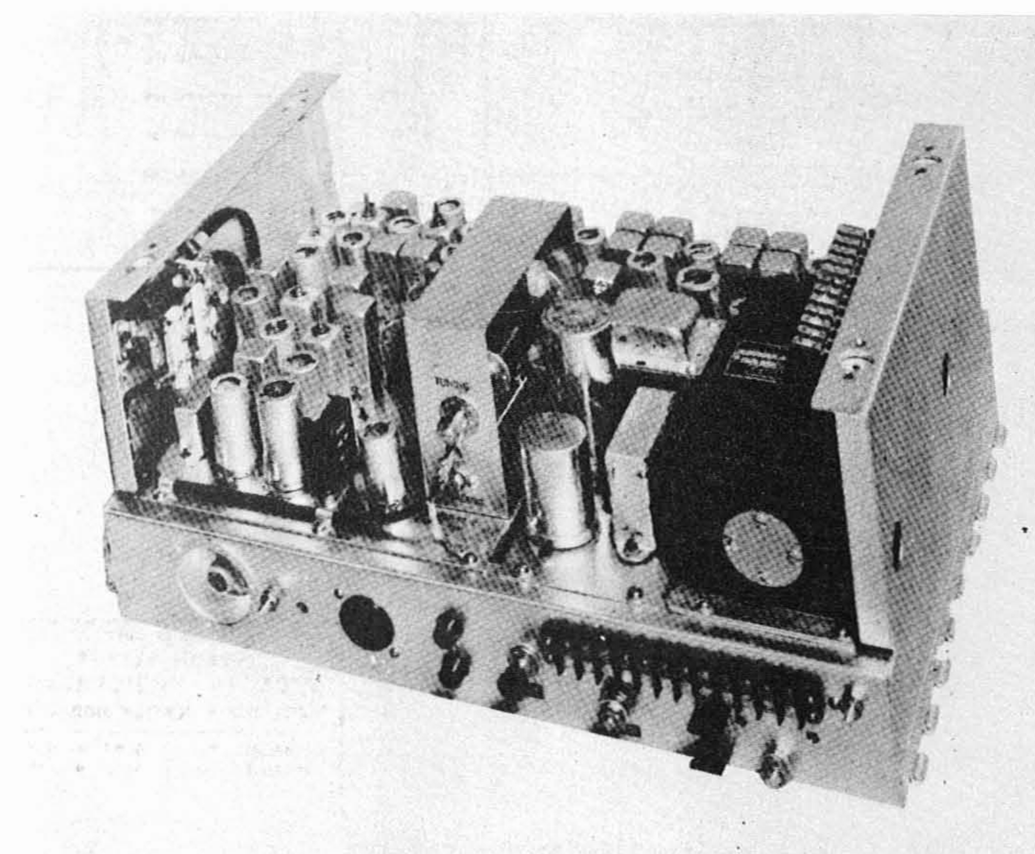


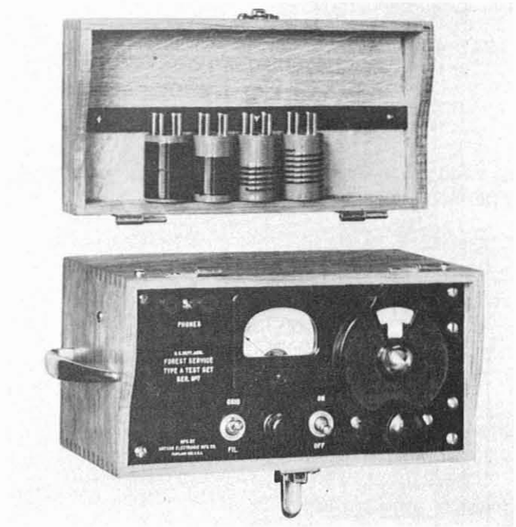
Schematic Diagram, Type TF-Model A, Transmitter

<u>Type KF*</u>

'Mobile FM'

Designed by:	W. F. Biggerstaff, 1947-48
Number produced:	10
Price:	Not available
Models:	A-T2-R
Frequency:	30-40 MHz
Transmitter:	25 watts, 2 channel, xtal, FM
Receiver:	Superheterodyne, 1 channel, xtal
Power:	6-volt auto battery
Antenna:	Mobile rod type
Dimensions:	16 1/2 x 8 1/2 x 15" circuitry 3 x 4 1/2 x 2" controls
Weight:	60#
Principal use:	Mobile
*Comments:	Current drain - 12 amps on standby, 22 amps to transmit Photo is of the first commercially produced model of this set. It is a RSMC-Type 1147 No photo of Lab prototype available





(Forest Service photo, History Section)
Test Set, Type A

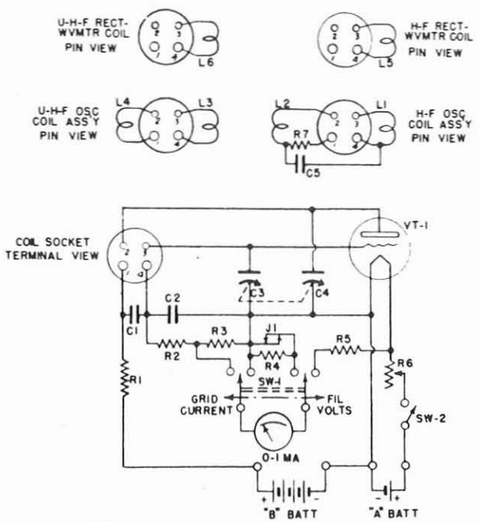
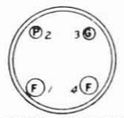


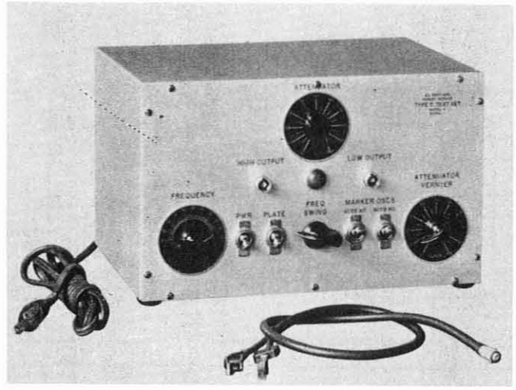
FIG. 1



SOCKET CONNECTIONS
TYPE 30
BOTTOM VIEW

U S DEPARTMENT OF AGRICULTURE
FOREST SERVICE
TYPE A TEST SET
MODEL A
DRAWN BY E H S
CHECKED BY H K L
SEPT 28, 1939

Schematic Diagram,
Test Set, Type A-Model A



(Forest Service photo, History Section,
15511)

Schematic Diagram, Test Set, Type D-Model A

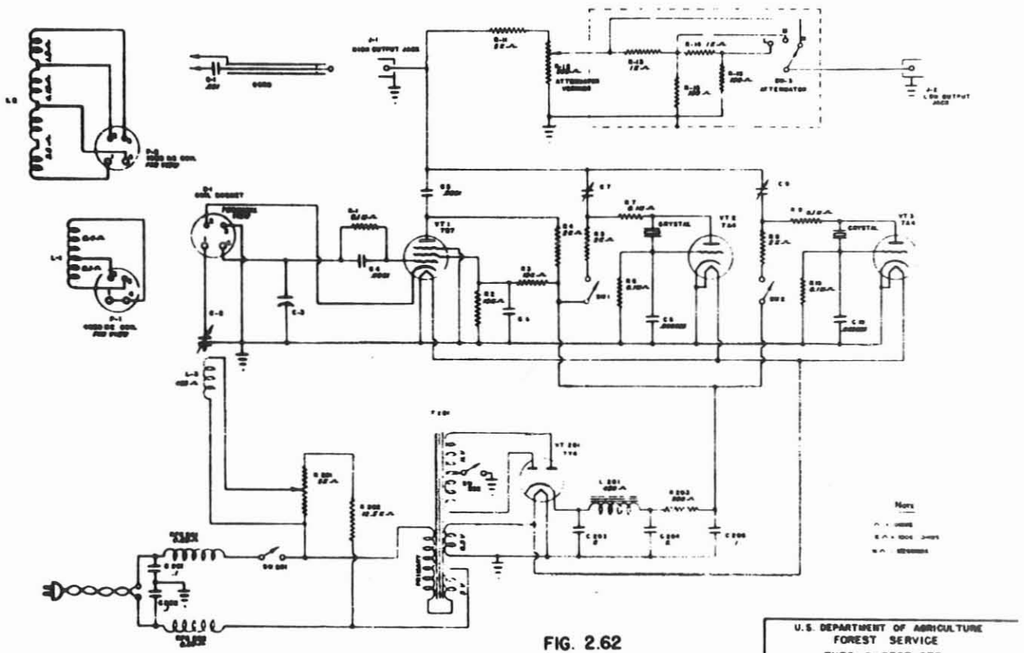
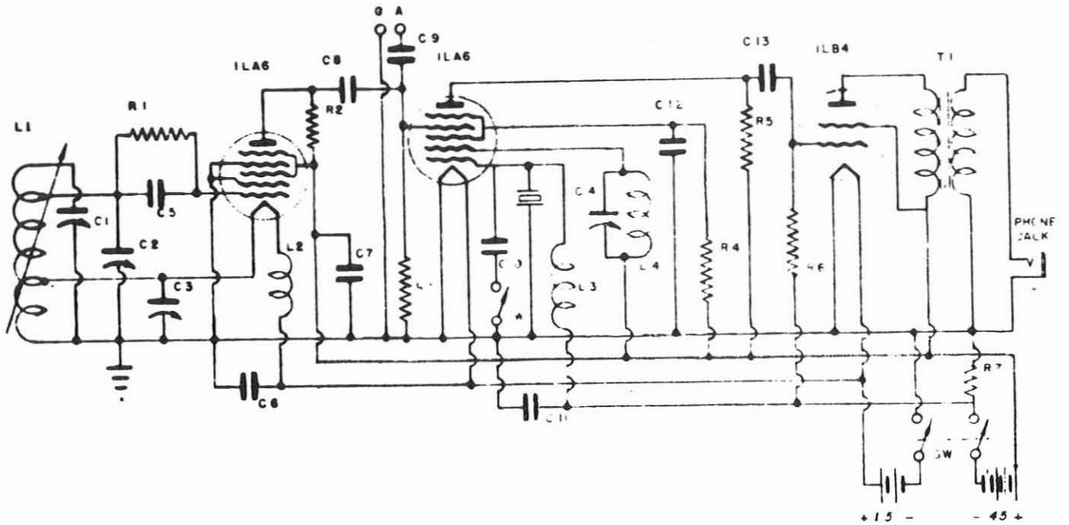


FIG. 2.62

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
TYPE D TEST SET
MODEL A



U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE	
HETERODYNE FREQUENCY METER TYPE C MODEL D	
DRAWN BY G.B.C. CHECKED BY H.K.L. DATE MAY 5, 1940	USFS RADIO LAB. DRWG. C-D-21-A

Schematic Diagram, Heterodyne Frequency Meter, Type C-Model D

Appendix II

Abbreviations Used in Text and Reference Notes

a.c.	-	alternating current
af	-	audiofrequency
a.f.c.	-	automatic frequency control
AM	-	amplitude modulation (the early form of radio broadcasting)
ARRL	-	American Radio Relay League
A. T. & T.	-	American Telephone and Telegraph Co.
AWS	-	Aircraft Warning System (Service)
BIFC	-	Boise Interagency Fire Center
BRC	-	Blister Rust Control
CCC	-	Civilian Conservation Corps
c.w.	-	continuous wave (used for transmitting signals in Morse code)
dB	-	decibel (measure of sound level)
Dx	-	long distance
EIA	-	Electrical Industries Association
FM	-	frequency modulation (the later form of radio broadcasting)
FCC	-	Federal Communications Commission
FPL	-	Forest Products Laboratory
FTS	-	Federal Telecommunications System
GAK	-	Gaylord A. Knight Collection
GE	-	General Electric Co.
GPO	-	Government Printing Office
GSA	-	Government Services Administration
hf	-	high frequency
Hz	-	hertz (unit of electromagnetic wave frequency; one cycle per second)
if	-	intermediate frequency