

Bell System Practices
Transmission Testing
K. F. A. I

TRANSMISSION MAINTENANCE PRACTICES

SECTION VII-A

AVERAGE AND LIMITING LOSSES FOR CIRCUITS AND EQUIPMENT

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 311

PROBLEM SET 1

Due: Monday, September 10, 2012

1. A particle of mass m moves in a circular path of radius r with constant speed v . Find the magnitude of the centripetal acceleration.

2. A car starts from rest and accelerates uniformly to a speed v in time t . Find the distance traveled.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

AVERAGE AND LIMITING LOSSES FOR
CIRCUITS AND EQUIPMENT

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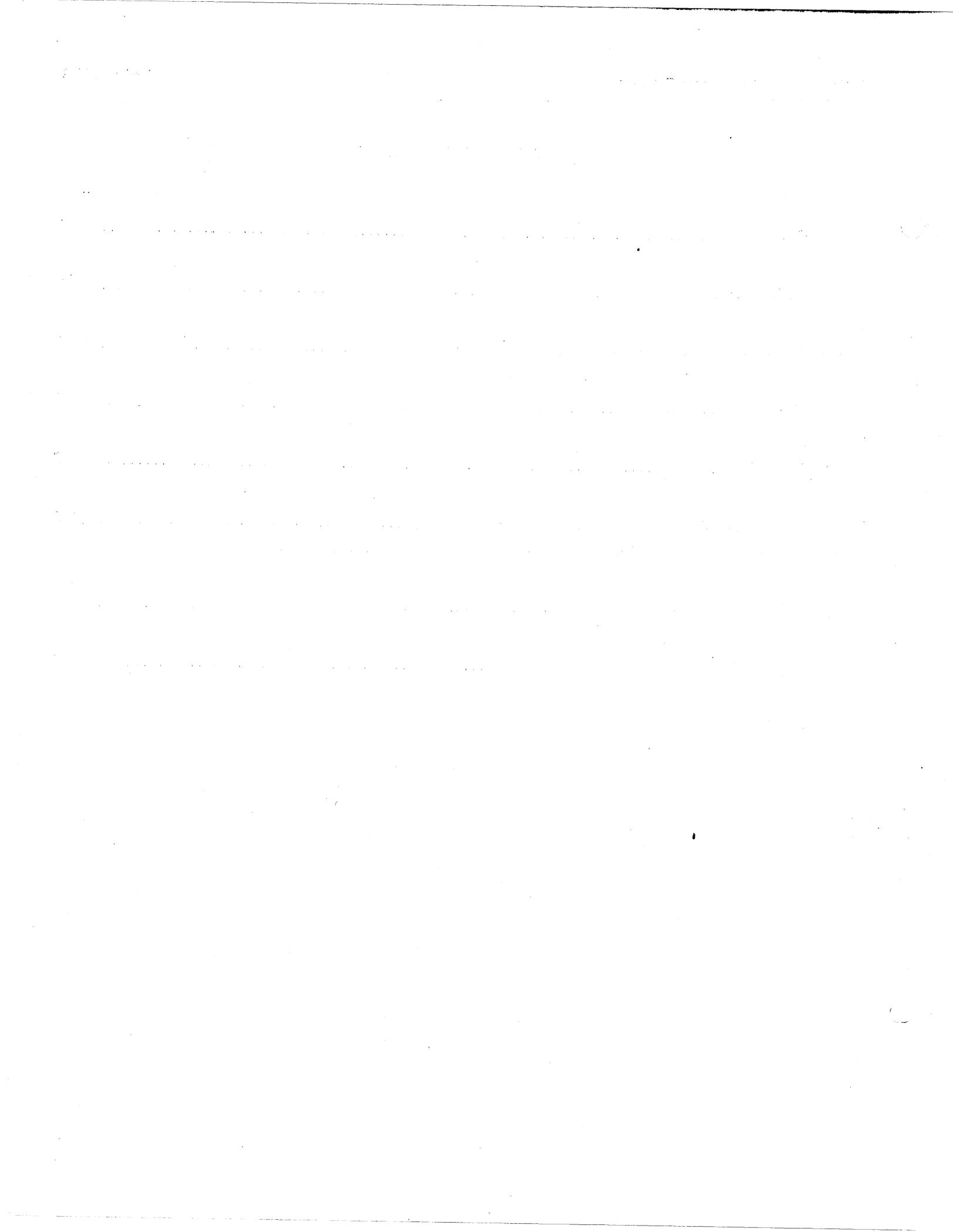
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AVERAGE AND LIMITING LOSSES FOR CIRCUITS AND EQUIPMENT

1.0 General

In maintaining circuits in the plant to their proper transmission efficiency, it is necessary to have available standard transmission loss figures for the circuits, and for the equipment used in them. Such losses have been obtained for the more important standard circuits, and are given in the accompanying tables and transmission circuit drawings. These tables and drawings are described below and should be used by the transmission testers in their routine maintenance work or in any special transmission testing which they may do.

Briefly stated, Table I is an index of drawings in which the standard A. T. & T. Company circuit drawings are cross-referenced with the corresponding transmission circuit drawings. Table II gives average losses and limiting losses based on manufacturing limits for individual pieces of equipment commonly found in the transmission circuits. Losses for the complete circuits are given on the corresponding transmission circuit drawings. Losses are expressed in transmission units (TU) and where measurements are made with instruments calibrated in "miles" corrections where necessary should be made as described later.

2.0 Table I

This table is a cross-reference between the transmission circuit drawings and the corresponding standard A. T. & T. Company drawings. It lists all of the A. T. & T. Company drawings divided according to the type of switchboard with which the circuits are associated and further subdivided with respect to the type of circuit for each switchboard. For each standard drawing there is given the number of the corresponding transmission circuit drawing.

When measurements are to be made in an office and the transmission testers are not familiar with the various circuits involved, they should first consult this table and determine from it the transmission circuits which are to be tested. Knowing this, they can then refer to the proper transmission circuit drawing and determine the average and limiting loss values to which they should work in making the tests.

3.0 Transmission Circuit Drawings and Losses

These drawings consist of transmission circuits for the American Telephone and Telegraph Company standard circuits for the types of standard switchboards in general use in the Bell System. They show the pieces of equipment which enter into the talking

circuits, and the electrical arrangement of the equipment in them.

The transmission circuits and the electrical arrangement of the equipment of many of the standard drawings are identical, and in these cases one sketch covers a number of standard drawings. On account of the great variety of relay combinations and condensers used with a particular type of repeating coil and the different losses which these combinations will cause, the data on the drawings should be used only in connection with the index.

On each drawing is given a table of the average and limiting losses of the circuit when it is measured under the conditions of impedance and testing current frequency shown in the table. Losses are given for all operating conditions when more than one arrangement of the apparatus in any circuit is provided for different kinds of service. Average losses are given for the various circuits when measured between impedances of 2200, 1300 and 600 ohms with 800-cycle testing current, and also when measured between impedances of 1800, 1200 and 600 ohms with 1000-cycle testing current. The limiting losses are given for the 600-ohm condition only, for both 800 and 1000-cycle testing current.

The average and limiting losses given are expressed in TU and when measurements are made with instruments calibrated in "miles" simple approximate corrections should be applied as follows:

**Amounts to be subtracted
from measured values for
comparison with losses on
simplified circuit drawings
and in Table II.**

Losses from	
0 to .9 mile, incl.	0
1 to 2.9 miles, incl.	0.1
3.0 to 4.9 miles, incl.	0.2

For example, if an "A" cord circuit measured 1.2 miles, this loss should be reduced by .1, which will give 1.1 TU, which is the figure given on the drawing. For losses of 5.0 miles or over, reduce these by 5.6% for comparison with the losses on the drawings and in Table II. For losses obtained with the 1-A and 1-B transmission measuring sets, which are calibrated in miles, no corrections will need to be made for losses less than 5 miles since the smallest reading on this set is half a mile and the accuracy with which measurements can be made is not sufficiently close to require the corrections given above.

The losses given on these drawings do not include any losses for switchboard wiring. For the most part, these drawings refer to circuits not involved in multiple cabling. In such cases, the switchboard losses depend largely on whether the apparatus is located in the switchboard or on racks in the terminal rooms. As the conditions may be different for the same transmission circuit in different cases, it is necessary, in order to take into account the effect of switchboard wiring, to add an amount estimated for each specific case. A good approximate rule to apply in doing this is as follows:

When the apparatus is located in the switchboard, no wiring loss should be added.

When the apparatus is located on racks in the terminal room and one cable run is involved, .1 TU should be added to both the average and limiting losses.

When the apparatus is located on racks in the terminal room and two cable runs are involved, .2 TU should be added to the average and limiting losses.

In the case of circuits involved in the multiple cabling such as the outgoing end of interoffice or toll switching trunks and either end of 2-way ringdown toll lines, a more careful estimate of the loss is often necessary. In some of the larger toll offices the switchboard wiring losses may be as high as one or two TU. The magnitude of these losses depends upon a number of variable factors such as the number and length of bridged multiples and the impedance at which the trunk is measured, and in each case it changes with variations in humidity. In order to facilitate making estimates of the magnitude of this loss in each case, figures are given below expressed in terms of loss per 100 feet of multiple based on average humidity conditions. These figures are as follows:

	H	M	L
TU per 100 feet	0.05	0.03	0.02

In using these figures, the total length of multiple may be assumed to be the sum of the lengths of all the bridged taps involved measured from the splicing point.

Under conditions of extreme humidity, the losses in the switchboard cabling may be several times as great as those given above. When measurements are made under conditions of this kind and a large amount of switchboard multiple is involved, the loss in the multiple at the time of measurement should be determined as a first step in looking for the cause of any excess losses.

When the transmission testers have determined, from Table I, the transmission drawings covering the circuits to be measured, they will obtain from these drawings, average and limiting losses for their circuits. These losses should, of course, be increased by switchboard wiring losses as described above. Average losses obtained in measuring a number of circuits should check fairly closely with the average losses given on the sketches. When a circuit exceeds the limiting loss, trouble is indicated and an investigation should be made to determine the cause. Also in certain cases the wrong type of equipment or missing equipment is indicated by a measured loss considerably less than the average. Various simple tests and inspections will often locate the trouble, but in cases where they do not, the individual pieces of apparatus should be tested. Average and limiting losses for these are given in Table II.

4.0 Table II

This table gives average losses and limiting losses based on manufacturing limits, expressed in TU, for individual pieces of equipment appearing in the transmission circuits, when the equipment is measured between impedances of 2200, 1300 and 600 ohms with 800-cycle measuring current and 1800, 1200 and 600 ohms with 1000-cycle measuring current. When measurements are made with instruments calibrated in "miles", the same correction factors apply as given for the losses on the simplified drawings. The table has been divided for convenience into two general parts, one for the 2200, 1300 and 600 ohms impedance conditions when the measuring current is 800 cycles and one for the 1800, 1200 and 600 ohms impedance conditions when the measuring current is 1000 cycles. Each part has been further subdivided into three parts; namely, series apparatus, shunt apparatus, and transformers, the latter including auto-transformers, induction coils and repeating coils.

The limiting losses given for complete circuits on the drawings were established with due regard to the manufacturing limits of the constants of the apparatus and to the cost of locating and clearing the trouble and the value of the transmission gain to be obtained thereby. The limiting losses given in Table II differ from the limiting losses on complete circuits in that the limits for the individual pieces of equipment are based on the manufacturing limits only. When the limiting loss for a complete circuit is exceeded, it is often necessary to measure specific pieces of apparatus in the circuit in order to locate the trouble. The losses given in Table II enable the tester to determine which parts of the circuit are defective.

5.0 Losses in Trunks

Two cases are considered below in connection with determining the limiting losses to which to work in testing trunks: (1) Where trunk and loop studies have been made, giving the limiting losses for which the trunk plant is designed, and (2) where such studies are not available.

5.1 Where Trunk and Loop Studies are Available

In these exchange areas the allowable limiting losses for trunks between any two offices should be those determined in trunk and loop studies. This will eliminate the necessity of computations to determine the equivalents of trunks or groups of trunks in advance of making the tests and thereby save considerable time and expense, especially in the larger exchange areas. When tests show the limits to be exceeded in any case and no trouble can be located, the make-up of the trunk should be obtained and the computed equivalent checked against the measured to determine such items as incorrect routing, wrong types of facilities, etc.

In cases where measured equivalents are as much as five TU better than the upper limits established in the trunk and loop studies, or where there is a difference of as much as five TU between individual trunks in the same trunk group the trunk layouts should be investigated to determine if higher grade facilities than necessary are being used when these might be needed to form sections of longer trunks or toll switching trunks. When the trunk equivalents are expressed in TU and measurements are made with instruments calibrated in "miles" the measured equivalents should be reduced by 5.6 per cent. before comparing with trunk equivalents expressed in TU.

5.2 Where Trunk and Loop Studies are not Available

In areas where the limiting standards of transmission between offices have not been established, the detailed make-up of the trunks should be determined and computations made prior to testing. Unit equivalents in terms of TU which may be used in computing the overall trunk equivalents are given on the attached drawing No. 38-Y-1646. The conductor losses thus computed should be increased by 10% to obtain limiting loss figures. If the measurements are made with instruments calibrated in "miles" the equivalents computed in TU should be increased by 15% to obtain limiting loss figures in miles for use with these instruments.

The trunk losses referred to above apply only to the conductor losses and since the routine testing work

is done between switchboards, the trunk circuit losses within the offices, that is, between switchboards and main frames, must be added to the conductor losses to obtain the complete overall trunk equivalents. The losses which are thus added should be the average losses of the trunk circuits associated with the trunk conductors as shown on the simplified circuit drawings and for the impedances at which the trunks are measured, except in cases where the equipment involves inequality ratio coils. In such cases, the losses added for the trunk circuits within the office should be those given for the corresponding unity ratio coils instead of those for the inequality ratio coils actually measured. Where regular cord circuits are used to connect two trunks together for loop testing, or to connect the trunks to the measuring set, the corresponding average losses of these cord circuits as determined from the drawings should be added to the overall trunk equivalents.

While, as has previously been stated, the losses for the office circuits to be added to the conductor losses in the cases described above are not exactly the same as would be obtained under service conditions, they are sufficiently accurate for purposes of checking computed against measured equivalents. The losses of these circuits when connected to trunks or lines and overall measurements are made, will generally be less than when they are connected directly to transmission measuring sets and measured separately from the trunks, so that adding the average losses given on the drawings will give a value somewhat larger than would be obtained by actual measurement.

6.0 Toll Circuit Conductor Losses

Unit equivalents in terms of TU, which should be used in computing the overall equivalents of the conductor losses in toll circuits of the types generally in use, are given on the attached Drawing No. 38-Y-1746. The net overall equivalents will also include losses due to equipment, reflection losses, repeater gains etc., which must be taken account of in computing the equivalents for use on the toll circuit layout record cards. Unless otherwise specified in the toll transmission testing routines the overall equivalents thus computed should be increased by 2 TU to give the limiting losses to work to. For circuits equipped with telephone repeaters the measured equivalents should also not be better than 2 TU from the computed losses. For long tandem repeater circuits, long four wire cable circuits, carrier circuits, etc., the above limits will not always apply and the current maintenance instructions for these should be followed in determining working limits.

7.0 Losses in Operators' Telephone Circuits

In testing operators' telephone circuits two kinds of measurements are specified: (1) a bridged measurement which is an indication of the loss introduced into a cord circuit by bridging the operator's telephone circuit across it, and (2) two loop measurements through the telephone circuit, indicative of the operator's transmitting and receiving losses, respectively. Losses for both of these conditions of measurement are given on the drawings.

The bridged losses given on the drawings are the losses which are measured with the sending and receiving terminals of the transmission measuring set connected together and the line terminals of the operator's telephone circuit bridged across them. The transmitting and receiving losses are loop measurements between the line terminals of the operator's circuit and the transmitter and receiver terminals respectively. At positions where the terminals of the operators' circuits are easily available, as at "B" positions, the measured losses may be compared directly with the figures given on the drawings. At "A" positions, however, where the telephone circuits are measured in connection with a cord circuit, the loss introduced by the cord circuit must be subtracted from the measurements before comparing them with the losses on the drawings.

When measuring an operator's circuit in connection with a cord circuit all measurements, bridged, transmitting and receiving, are made using only the calling cord of the cord circuit with the talking key operated so as to bridge the telephone circuit across the cord. To make these measurements a cord circuit which measures average should be used. The loss of this

cord circuit should be determined by connecting the calling cord to either the sending or receiving terminals of the transmission measuring set and multiplying these terminals together. If the talking key associated with the cord circuit is operated, a measurement will give the combined loss of the cord and operator's circuit in the bridged condition. The difference between this measurement and the measurement of the cord alone will give the loss of the operator's circuit and this loss may be compared with those on the drawings. Similarly, if this cord circuit loss is subtracted from the combined loss of the cord circuit and the operator's circuit in the transmitting and receiving conditions respectively, these losses can be also compared with those on the drawings.

The losses for operators' telephone circuits given on the drawings presume the operator's telephone set replaced by the No. 220 plug or some similar arrangement, which substitutes a 200-ohm resistance for the receiver for bridged and transmitting loss measurements, and a 40-ohm resistance for the transmitter for bridged and receiving loss measurements.

Average losses are given on the drawings for three impedance conditions for the bridged losses, and 600 ohms impedance for transmitting and receiving losses, for each frequency of testing current. Limiting figures are given for 600 ohms impedance for a loop measurement through the operator's circuit, either transmitting or receiving, and in some cases where it is necessary a bridged measurement also. In case a measurement shows any limit exceeded, or shows a loss less by any considerable amount than the average figure given, it is an indication of trouble and should be investigated.

Attached:

Table I—Index to
Transmission Circuits.

Table II—Average and
Limiting Losses of Trans-
mission Circuit Apparatus.

Drawings Nos. 38-Y-
1646 and 38-Y-1746.

Set of Transmission
Circuit Drawings.

AVERAGE AND LIMITING LOSSES FOR
CIRCUITS AND EQUIPMENT

TABLE I

INDEX TO TRANSMISSION CIRCUITS

The transmission circuit drawings include all transmission conditions of the A. T. & T. Company standard drawings up to and including the issue numbers given in the table. Where dates instead of issue numbers are given in the "Issue No." column, numbers had not been assigned at that time.

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. This is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and techniques used to collect and analyze data. This includes both qualitative and quantitative approaches, as well as the use of advanced statistical tools and software.

3. The third part of the document focuses on the interpretation and application of the collected data. This involves identifying trends, patterns, and anomalies, and then using this information to inform decision-making and strategic planning.

4. The fourth part of the document discusses the challenges and limitations of data analysis. This includes issues such as data quality, bias, and the potential for overfitting, as well as the need for ongoing monitoring and evaluation.

5. The fifth part of the document provides a summary of the key findings and conclusions of the study. This includes a discussion of the overall impact of the research and the implications for future work in the field.

6. The sixth part of the document contains a list of references and sources used in the research. This includes both primary and secondary sources, as well as relevant literature and reports.

7. The seventh part of the document is a concluding statement that reiterates the main points of the document and expresses the author's appreciation for the support and assistance provided throughout the project.

No. 1 SWITCHBOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.	
	Dwg. No.	Issue No.		
Call Circuits				
	Regular	161-B-33	4	38-Y-1889, fig. 1
		174-B-34	4	38-Y-1860, fig. 2
	181-B-91	1	"	
Emergency	137-B-1	6	38-Y-1844	
	170-B-46	3	38-Y-1800, fig. 1	
Cords				
	Subscribers'	52-B-32	8	38-Y-1878
		59-B-16	12/8/13	"
		71-B-44	8	"
		77-B-40	4/14/13	"
		78-B-18	6	"
		78-B-49	4/14/13	"
		80-B-35	6	"
		81-B-31	13	"
		81-B-33	10	"
		81-B-40	10	"
		85-B-6	8	"
		135-B-9	2/3/19	"
		135-B-39	2/3/19	"
		136-B-24	2/3/19	"
		152-B-48	12	"
		152-B-49	12	"
		155-B-25	6	"
		155-B-46	8	"
		156-B-8	9	"
		157-B-3	6	"
		172-B-6	3	"
		172-B-7	4	"
		172-B-8	4	"
		177-B-82	7	"
		180-B-5	16	"
		181-B-68	7	"
		181-B-69	9	"
		181-B-70	9	"
		181-B-71	7	"
		181-B-72	7	"
		181-B-73	7	"
		181-B-74	9	"
	181-B-75	7	"	
	181-B-76	10	"	
	181-B-77	5	"	
	181-B-78	8	"	
	181-B-79	8	"	
	181-B-80	9	"	
	181-B-81	10	"	
	181-B-82	10	"	
	181-B-83	12	"	

No. 1 Switchboard (Cont'd)

Type of Circuit Cords (Cont'd)	A. T. & T. CO.		Transmission Circuit Dwg. No.	
	Dwg. No.	Issue No.		
Universal	89-B-23	2/15/16	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	89-B-43	8/25/19	38-Y-1846, fig. 2 38-Y-1854, B 38-Y-1855, fig. 1	
	93-B-11	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	167-B-25	8	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	167-B-26	3	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	174-B-17	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	174-B-18	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	181-B-38	7	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	181-B-39	7	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849	
	Trouble Operators'	59-B-33	9/15/11	38-Y-1804
		71-B-3	2/21/11	38-Y-1878
		78-B-19	2/21/11	"
		81-B-44	2/21/11	"
179-B-97		3	"	
Line Circuits	Long	85-B-35	3/21/24	38-Y-1803, fig. 1, A
		86-B-6	8	38-Y-1803, fig. 1, B
		118-B-10	5/1/14	38-Y-1851, B
		140-B-42	5/1/14	" "
		166-B-18	8	38-Y-1873
		168-B-5	16	38-Y-1853, A 38-Y-1875
			17	38-Y-1864, fig. 1, A & C
		189-B-75	4	38-Y-1831, fig. 1
		Subscribers'	114-B-47	9/12/19	38-Y-1806
145-B-20	5		38-Y-1819, fig. 1 38-Y-1858	
147-B-2	5		38-Y-1819, fig. 1 38-Y-1858	

No. 1 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Line Circuits (Cont'd)			
Toll	139-B-19	7/16/12	38-Y-1858 38-Y-1823, fig. 1
Operators' Telephone			
Subscribers'	52-B-37	6	38-Y-1907, fig. 1, A & B
	55-B-29	10	" " " "
	56-B-19	9	38-Y-1907, fig. 1, A
	81-B-34	9	38-Y-1913, fig. 1, A & B
	90-B-39	1/5/17	38-Y-1918, fig. 1, AC, BC
	136-B-23	10	38-Y-1907, fig. 1, A & B
	158-B-43	3	38-Y-1913, fig. 1, A & B
	158-B-44	3	" " " "
	158-B-45	3	38-Y-1907, fig. 1, A & B
	158-B-46	3	" " " "
	158-B-47	6	38-Y-1918, fig. 1, AC, BC
	158-B-48	7	" " " "
	160-B-45	6	" " " "
	167-B-45	7	" " " "
	172-B-11	3	38-Y-1907, fig. 1, A & B
	172-B-12	5	38-Y-1913, fig. 1, A & B
	179-B-100	4	38-Y-1907, fig. 1, A & B 38-Y-1913, fig. 1, A & B 38-Y-1917, fig. 2, A & B 38-Y-1921, fig. 2, A & B
Tandem	140-B-40	20	38-Y-1920, fig. 2
	175-B-23	11	38-Y-1918, fig. 1, AC, BC
	193-B-20	2	" " " "
Trouble	136-A-28	4	38-Y-1907, fig. 1, A & B 38-Y-1913, fig. 1, A & B
	136-A-29	4	38-Y-1907, fig. 1, A & B 38-Y-1913, fig. 1, A & B
	138-A-52	3	38-Y-1918, fig. 1, AC, BC
	138-A-53	3	" " " "
	179-B-96	4	38-Y-1907, fig. 1, B
	180-B-3	7	38-Y-1907, fig. 1, A & B
	180-B-4	5	" " " "
"B" or Trunk	52-B-40	16	38-Y-1920, fig. 2
	89-B-40	3/11/15	" " "
	103-B-7	10/23/17	" " "
	149-B-26	14	38-Y-1918, fig. 1, BC
	166-B-1	9	38-Y-1920, fig. 2
	174-B-36	14	38-Y-1918, fig. 1, BC
	174-B-40	2	" " " "
	175-B-50	11	" " " "
	188-B-48	3	" " " "
	188-B-49	3	" " " "
	194-B-5	5	38-Y-1924, fig. 2
	194-B-6	4	" " "

No. 1 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Operators' Telephone (Cont'd)			
"B" or Trunk (Cont'd)	194-B-7	3	38-Y-1924, fig. 2
	194-B-8	3	" " "
Supervisors'			
"A" Supervisors'	118-A-26	9	38-Y-1907, fig. 2, A & B
	136-A-44	8	38-Y-1907, fig. 2, B
	75-B-13	7	38-Y-1895, fig. 2
	140-B-35	5/29/12	38-Y-1907, fig. 2, A & B
	140-B-37	11/25/13	38-Y-1907, fig. 2, B
Combined "A" & "B" Supervisors'	124-A-41	5	38-Y-1907, fig. 2, A & B
	136-A-45	6	" " " " "
"B" Supervisors'	118-A-27	10	38-Y-1907, fig. 1, A
			38-Y-1916, fig. 2
	118-A-29	8	38-Y-1910
			38-Y-1916, fig. 2
			38-Y-1907, fig. 1, A
	124-A-34	5	38-Y-1907, fig. 1, A
			38-Y-1916, fig. 2
	124-A-38	4	38-Y-1910
			38-Y-1916, fig. 2
			38-Y-1907, fig. 1, A
	128-A-34	4	38-Y-1910
			38-Y-1916, fig. 2
			38-Y-1907, fig. 1, A
	128-A-35	3	38-Y-1907, fig. 1, A
			38-Y-1916, fig. 2
	135-A-49	6	38-Y-1916, fig. 2
			38-Y-1907, fig. 1, A
	135-A-51	7	38-Y-1916, fig. 2
			38-Y-1910
			38-Y-1907, fig. 1, A
	136-A-2	5	38-Y-1907, fig. 1, A
			38-Y-1916, fig. 2
	136-A-77	10	38-Y-1916, fig. 2
			38-Y-1910
			38-Y-1907, fig. 1, A
	140-B-36	11/25/13	38-Y-1907, fig. 1, A
			38-Y-1916, fig. 2
	143-B-1	11/25/13	38-Y-1907, fig. 1, A
			38-Y-1916, fig. 2
			38-Y-1910
Trunks			
Incoming	52-B-41	11/17/14	38-Y-1872, A
	52-B-44	4	38-Y-1871
	55-B-23	11/18/14	38-Y-1872, A
	55-B-37	5/13/11	38-Y-1878
	55-B-39	5/13/11	38-Y-1872, B
	59-B-18	5/11/14	38-Y-1873

No. 1 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Trunks (Cont'd)			
Incoming (Cont'd)	62-B-19	9	38-Y-1802, fig. 2
			38-Y-1800, fig. 1
	72-B-19	5/13/11	38-Y-1878
	75-B-34	15	38-Y-1874, A
	75-B-36	11/3/16	38-Y-1872, A
	78-B-47	2/4/19	38-Y-1800, fig. 2
	85-B-18	10/28/15	38-Y-1872, A
	89-B-29	5/11/14	38-Y-1875
	91-B-19	3/20/15	38-Y-1872, B
	91-B-24	11/13/16	" "
	98-B-21	5/13/11	" "
	108-B-33	11/13/16	" "
	118-B-9	5/11/14	38-Y-1875
	126-B-2	11/18/14	38-Y-1872, A
	126-B-3	11/18/14	" "
	135-B-15	7/16/12	38-Y-1872, B
	135-B-46	12	" "
		17	38-Y-1873
	137-B-44	5/11/14	38-Y-1875
	137-B-48	7/16/12	38-Y-1872, B
	139-B-39	5/6/13	" "
	140-B-5	9/5/12	" "
	140-B-16	9/19/13	" "
	140-B-43	3/20/15	" "
	142-B-36	9/5/12	" "
	143-B-13	9/19/13	" "
	143-B-16	9/19/13	" "
	143-B-24	9/19/13	" "
	143-B-38	5/5/13	" "
	152-B-18	4/18/17	" "
	155-B-32	7	" "
	155-B-33	5	" "
	155-B-34	6	" "
	159-B-6	5	38-Y-1872, A
		6	38-Y-1872, A
		15	38-Y-1874, A
	163-B-18	5	38-Y-1872, B
		6	38-Y-1872, B
		14	38-Y-1873
	166-B-31	3	38-Y-1872, B
		11	38-Y-1873
	168-B-14	5	38-Y-1872, B
		13	38-Y-1873
	189-B-52	5	38-Y-1874, A
	189-B-53	7	" "
Local	93-B-36	11	38-Y-1802, fig. 1
	159-B-24	9	" " "

No. 1 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Trunks (Cont'd)			
Local (Cont'd)			
	161-B-46	2	38-Y-1802, fig. 1
	169-B-43	3	38-Y-1823, fig. 2
	170-B-13	4	38-Y-1801, fig. 2
	179-B-29	2	38-Y-1802, fig. 1
	181-B-98	3	38-Y-1821, fig. 2
	188-B-95	3	38-Y-1802, fig. 1
Outgoing			
	126-B-1	2/13/14	38-Y-1845
	136-B-21	3/22/16	38-Y-1851, B
	145-B-25	7	" "
	147-B-39	13	38-Y-1890
		20	38-Y-1887, fig. 1
			38-Y-1890
	153-B-48	4	38-Y-1887, fig. 2
	154-B-11	13	38-Y-1859
			38-Y-1889, fig. 2
			38-Y-1886, fig. 2
	161-B-34	3	38-Y-1889, fig. 1
Recording			
	139-B-38	8/1/14	38-Y-1800, fig. 2
	162-B-35	10	" " "
	166-B-21	1	38-Y-1887, fig. 1
			38-Y-1890
		7	38-Y-1891, fig. 1
			38-Y-1891, fig. 2
Ringdown (One-Way)			
	92-B-50	8	38-Y-1806
	128-B-50	7	38-Y-1859
	131-B-15	6	38-Y-1851, B
Ringdown (Two-Way)			
	52-B-48	6/16/02	38-Y-1806
	56-B-15	5/29/03	"
	75-B-24	11/28/13	38-Y-1803, fig. 1, B
	75-B-35	12/12/11	38-Y-1806
	77-B-5	10/19/21	38-Y-1871
	77-B-15	10/3/13	38-Y-1859
	126-B-8	8	38-Y-1871
	126-B-9	10	38-Y-1851, B
	126-B-10	7	38-Y-1859
	135-B-23	2/21/12	38-Y-1851, B
	168-B-33	11	38-Y-1861, fig. 2
Toll Switching			
	53-B-21	6/13/13	38-Y-1876, A
	55-B-32	9/5/13	" "
	62-B-21	6/16/13	" "
	66-B-45	6/16/13	38-Y-1860, fig. 2
	70-B-48	9/6/13	38-Y-1876, A
	71-B-19	6/17/13	38-Y-1875
	75-B-12	6/16/13	38-Y-1860, fig. 2
	81-B-25	6/16/13	38-Y-1876, A
	81-B-26	6/16/13	" "

No. 1 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Trunks (Cont'd)			
Toll Switching (Cont'd)	81-B-29	11/20/13	38-Y-1860, fig. 2
	81-B-35	11/20/13	" " "
	85-B-11	5/16/11	" " "
	85-B-23	11/20/13	38-Y-1876, A
	85-B-25	11/20/13	38-Y-1860, fig. 2
	86-B-24	11/20/13	38-Y-1871
	101-B-29	5/16/11	38-Y-1876, A
	108-B-14	6/16/13	38-Y-1860, fig. 2
	108-B-15	6/16/13	38-Y-1876, A
	116-B-38	6/14/13	" "
	126-B-5	6/13/13	" "
	126-B-6	6/13/13	" "
	129-B-40	11/20/13	38-Y-1852, B
	135-B-16	7/16/12	" "
	136-B-30	2/3/14	38-Y-1876, A
	140-B-46	12/3/13	38-Y-1852, B
	140-B-48	6/23/15	" "
	143-B-28	6/7/15	38-Y-1875
	143-B-32	9/5/13	38-Y-1876, A
	145-B-49	11/20/13	38-Y-1852, B
	152-B-16	9/6/13	38-Y-1876, A
	152-B-17	9/6/13	" "
	152-B-19	3/29/13	38-Y-1848
	152-B-39	11	"
	153-B-1	12	"
	153-B-2	9	"
	153-B-12	11	"
	153-B-13	12	"
	153-B-29	11	"
	157-B-35	9	"
	157-B-36	7	"
	157-B-37	11	"
	157-B-38	11	"
	159-B-7	9	"
	163-B-12	10	"
	170-B-12	9	"
Toll Switching (Call Wireless)	159-B-16	12	38-Y-1848
Miscellaneous			
Plugging Up	71-B-4	3/16/10	38-Y-1803, fig. 2

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NO. 1-C SWITCHBOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Call Circuits			
Emergency	156-B-27	6	38-Y-1844
	176-B-18	4	38-Y-1800, fig. 1
Cords			
Subscribers'	121-A-5	10	38-Y-1878
	121-A-6	8	"
	121-A-7	8	"
	121-A-8	8	"
	121-A-9	12	"
	121-A-10	9	"
	121-A-11	9	"
	121-A-12	9	"
	121-A-13	10	"
	121-A-14	8	"
	121-A-15	8	"
	121-A-16	8	"
	140-A-79	6	"
	140-A-80	6	"
	140-A-81	7	"
	140-A-82	6	"
	140-A-83	5	"
	140-A-84	5	"
	180-B-30	5	"
	180-B-31	6	"
	180-B-32	5	"
	180-B-33	7	"
	180-B-34	5	"
	180-B-35	6	"
	180-B-36	4	"
	180-B-37	5	"
	180-B-38	6	"
	180-B-39	6	"
	180-B-40	4	"
	180-B-41	6	"
Universal	121-A-19	8	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-20	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-21	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-22	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-23	10	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849

No. 1-C Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Cords (Cont'd)			
Universal (Cont'd)	121-A-24	7	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-25	7	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-26	7	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-27	8	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-28	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-29	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	121-A-30	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-42	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-43	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-44	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-45	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-46	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-47	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-48	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-49	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-50	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-51	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849

No. 1-C Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Cords (Cont'd)			
Universal (Cont'd)	180-B-52	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-53	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
Semi-Universal	140-A-85	3	38-Y-1873 38-Y-1874, B
	140-A-86	3	38-Y-1873 38-Y-1874, B
	140-A-87	4	38-Y-1873 38-Y-1874, B
	140-A-88	4	38-Y-1873 38-Y-1874, B
	140-A-89	3	38-Y-1873 38-Y-1874, B
Line Circuits			
Rural	156-B-5	8	38-Y-1819, fig. 1
	156-B-6	8	“ “ “
Operators' Telephone			
Subscribers'	159-B-33	7	38-Y-1907, fig. 1, A & B
	159-B-34	8	38-Y-1918, fig. 1, AC, BC
	159-B-48	8	38-Y-1917, fig. 2, A & B
	159-B-49	9	38-Y-1918, fig. 1, AC, BC
Trouble	136-A-66	5	38-Y-1907, fig. 1, A & B 38-Y-1918, fig. 1, AC, BC
	136-A-67	6	38-Y-1907, fig. 1, A & B 38-Y-1918, fig. 1, AC, BC
	187-B-74	2	38-Y-1907, fig. 1, B
Trunk	159-B-35	4	38-Y-1918, fig. 1, BC
	176-B-15	9	“ “ “ “
	181-B-34	5	“ “ “ “
	189-B-3	2	“ “ “ “
Supervisors'			
“A” Supervisors'	121-A-32	5	38-Y-1907, fig. 2, B
	136-A-50	9	“ “ “ “
Combined “A” & “B” Supervisors'	121-A-35	5	38-Y-1907, fig. 2, A & B
	136-A-51	7	“ “ “ “
“B” Supervisors'	121-A-33	7	38-Y-1907, fig. 1, A 38-Y-1916, fig. 2
	136-A-80	8	38-Y-1916, fig. 2 38-Y-1907, fig. 1, A 38-Y-1910

No. 1-C Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Trunks			
Incoming Call Circuit	161-B-47	4	38-Y-1872, B
		13	38-Y-1873
	161-B-48	4	38-Y-1872, B
		12	38-Y-1873
	189-B-45	3	"
Local	159-B-43	6	38-Y-1804
	187-B-17	2	38-Y-1821, fig. 2
Outgoing	159-B-41	4	38-Y-1887, fig. 1
		4	38-Y-1890
	159-B-42	7	38-Y-1887, fig. 1
		7	38-Y-1890
	189-B-35	1	38-Y-1887, fig. 2
		1	38-Y-1889, fig. 1
	189-B-54	2	38-Y-1889, fig. 2
		2	38-Y-1886, fig. 2
Recording	159-B-44	7	38-Y-1800, fig. 2
Ringdown (Two-way)	154-B-33	4	38-Y-1867, fig. 1, A
	159-B-46	4	38-Y-1859
	159-B-47	4	38-Y-1851, B
	161-B-45	4	38-Y-1856
	177-B-88	5	38-Y-1861, fig. 2
		5	
Toll Switching	155-B-47	11	38-Y-1848
	155-B-48	9	"
	155-B-49	11	"
	155-B-50	9	"
	189-B-36	2	"
	189-B-37	2	"
Toll Switching (Call Wireless)	189-B-38	3	38-Y-1848
	189-B-41	2	"
	189-B-43	1	"

NO. 1-D SWITCHBOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Call Circuits			
Regular	165-B-30	3	38-Y-1889, fig. 1
	177-B-59	2	38-Y-1860, fig. 2
Emergency	165-B-28	6	38-Y-1844
	165-B-29	2	38-Y-1800, fig. 1
	177-B-56	3	“ “ “
Cords			
Subscribers'	165-B-4	5	38-Y-1878
	165-B-5	5	“
	165-B-6	5	“
	165-B-7	5	“
Universal	173-B-9	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	173-B-15	5	38-Y-1842 38-Y-1847 38-Y-1849
	173-B-16	5	38-Y-1842 38-Y-1847 38-Y-1849
	173-B-17	5	38-Y-1842 38-Y-1847 38-Y-1849
	173-B-18	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	173-B-19	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	173-B-20	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	173-B-21	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	173-B-38	5	38-Y-1842 38-Y-1847 38-Y-1849
	173-B-39	4	38-Y-1842 38-Y-1847 38-Y-1849
	173-B-40	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	173-B-44	4	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849

No. 1-D Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.	
	Dwg. No.	Issue No.		
Cords (Cont'd) Semi-Universal	173-B-1	5	38-Y-1847 38-Y-1849	
	173-B-2	5	38-Y-1847 38-Y-1849	
	173-B-3	5	38-Y-1847 38-Y-1849	
	173-B-4	5	38-Y-1847 38-Y-1849	
	173-B-5	5	38-Y-1847 38-Y-1849	
	173-B-6	5	38-Y-1847 38-Y-1849	
	173-B-7	5	38-Y-1847 38-Y-1849	
	173-B-8	5	38-Y-1847 38-Y-1849	
	173-B-10	5	38-Y-1842 38-Y-1847	
	173-B-11	5	38-Y-1842 38-Y-1847	
	173-B-12	6	38-Y-1842 38-Y-1847	
	173-B-13	4	38-Y-1846, fig. 2 38-Y-1847	
	173-B-14	4	38-Y-1846, fig. 2 38-Y-1847	
	173-B-36	5	38-Y-1842 38-Y-1847	
	173-B-37	5	38-Y-1842 38-Y-1847	
	173-B-45	4	38-Y-1846, fig. 2 38-Y-1847	
	Miscellaneous	173-B-41	5	38-Y-1849
	Line Circuits Long	177-B-6	3	38-Y-1803, fig. 1, A
		177-B-7	3	38-Y-1803, fig. 1, B
179-B-51		2	38-Y-1853, A	
192-B-92		2	38-Y-1831, fig. 1	
Rural	165-B-3	5	38-Y-1819, fig. 1 38-Y-1858	
Operators' Telephone Subscribers'	165-B-8	4	38-Y-1907, fig. 1, A & B	
	165-B-34	5	38-Y-1918, fig. 1, AC, BC	
Combined Subscribers' & Trouble	173-B-42	6	38-Y-1918, fig. 2, A & B	

No. 1-D Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Operators' Telephone (Cont'd)			
Toll	165-B-10	5	38-Y-1892, fig. 2, A 38-Y-1918, fig. 1, AC, BC
Trouble	136-A-71	4	38-Y-1907, fig. 1, A & B 38-Y-1918, fig. 1, AC, BC
	136-A-72	4	38-Y-1907, fig. 1, A & B 38-Y-1918, fig. 1, AC, BC
"B" or Trunk	165-B-9	3	38-Y-1918, fig. 1, BC
	177-B-29	8	" " " "
Supervisors'			
	165-B-36	4	38-Y-1895, fig. 2
	173-B-50	11	38-Y-1907, fig. 2, A & B
Trunks			
Incoming Call Circuit	165-B-25	10	38-Y-1874, A
	165-B-26	10	" "
	165-B-49	2	38-Y-1872, B
	165-B-50	2	" "
		6	38-Y-1873
	173-B-31	2	38-Y-1872, B
		6	38-Y-1873
	173-B-33	2	38-Y-1872, B
		6	38-Y-1873
	179-B-14	9	38-Y-1874, A
	196-B-19	2	38-Y-1873
	196-B-35	1	"
	196-B-36	1	"
	Local	173-B-23	6	38-Y-1802, fig. 1
173-B-29		6	38-Y-1823, fig. 2
173-B-30		6	" " "
187-B-16		2	38-Y-1821, fig. 2
195-B-60		1	38-Y-1802, fig. 1
Outgoing	165-B-13	3	38-Y-1889, fig. 1
	165-B-14	6	38-Y-1889, fig. 2 38-Y-1886, fig. 2
	165-B-33	7	38-Y-1890 38-Y-1887, fig. 1
	177-B-34	2	38-Y-1890 38-Y-1887, fig. 1
		5	38-Y-1890 38-Y-1887, fig. 2
Recording	165-B-47	5	38-Y-1800, fig. 2
	165-B-48	4	38-Y-1891, fig. 1 38-Y-1891, fig. 2
	173-B-24	4	38-Y-1801, fig. 1

No. 1-D Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Trunks (Cont'd)			
Ringdown (Two-way)	173-B-43	6	38-Y-1861, fig. 2
	177-B-32	8	38-Y-1871
Toll Switching	165-B-16	5	38-Y-1848
	165-B-18	5	"
	165-B-19	5	"
	165-B-20	7	"
	165-B-22	5	"
	165-B-23	5	"
	165-B-24	6	"
	177-B-30	3	"
	177-B-31	6	"
178-B-13	2	"	
Toll Switching (Call Wireless)	165-B-17	5	38-Y-1848
	165-B-21	7	"

NO. 1 TANDEM SWITCHBOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Call Circuits			
Regular	162-B-49	2	38-Y-1889, fig. 1
	181-B-36	2	38-Y-1860, fig. 2
Emergency	157-B-41	3	38-Y-1819, fig. 1
Operators' Telephone			
Tandem	154-B-14	11	38-Y-1920, fig. 2
	181-B-43	7	38-Y-1918, fig. 1, AC, BC
Supervisors'			
	120-B-43	11	38-Y-1919, A
Trunks			
Incoming	154-B-17	10	38-Y-1802, fig. 2



NO. 8 SWITCHBOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Cords			
Subscribers'	55-B-50	3/12/19	38-Y-1801, fig. 2
	71-B-6	3/12/19	38-Y-1832, fig. 1
	80-B-30	3/12/19	38-Y-1801, fig. 2
	92-B-41	9/13/13	38-Y-1801, fig. 2 38-Y-1832, fig. 1 38-Y-1821, fig. 1
Universal	75-B-42	9/28/15	38-Y-1842
	75-B-44	9/28/15	38-Y-1850, A
	94-B-12	9/28/15	38-Y-1850, A 38-Y-1858
	94-B-13	9/28/15	38-Y-1842 38-Y-1850, A
	Semi-Universal	75-B-43	9/28/15	38-Y-1842
75-B-45		9/28/15	38-Y-1850, A
81-B-1		3/12/19	38-Y-1842
81-B-2		3/12/19	38-Y-1850, A 38-Y-1858
81-B-5		3/12/19	38-Y-1842
94-B-11		3/12/19	38-Y-1850, A 38-Y-1858
Miscellaneous		80-B-43	3/12/19	38-Y-1863, fig. 1 38-Y-1862, A
	Line Circuits		
Subscribers'	55-B-48	3/12/19	38-Y-1803, fig. 2
	97-B-23	3/12/19	" " " "
	108-B-24	3/12/19	38-Y-1808, fig. 1
	149-B-49	10/4/12	38-Y-1819, fig. 1
Toll	61-B-20	3/12/19	38-Y-1804
	75-B-41	3/12/19	"
Operators' Telephone			
Subscribers'	55-B-43	3/12/19	38-Y-1907, fig. 1, A
	58-B-24	3/12/19	" " " "
	71-B-8	3/12/19	38-Y-1912, fig. 2, A
	80-B-27	3/12/19	38-Y-1912, fig. 2, A & B
Toll	75-B-46	3/13/19	38-Y-1907, fig. 1, A
	149-B-35	6	38-Y-1907, fig. 1, A & B
Trunk	61-B-41	3/12/19	38-Y-1918, fig. 1, AC
	61-B-49	3/12/19	" " " "
	68-B-7	3/12/19	38-Y-1920, fig. 2

No. 8 Switchboard (Cont'd)

Type of Circuit Supervisors'	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
	94-B-14	3/12/19	38-Y-1898, fig. 1
Trunks			
Local	58-B-2	3/12/19	38-Y-1807, fig. 1
	91-B-6	3/12/19	38-Y-1804
Outgoing	68-B-10	3/12/19	38-Y-1803, fig. 2
Ringdown (One-way)	68-B-49	3/12/19	38-Y-1824, fig. 1
Ringdown (Two-way)	61-B-21	3/12/19	38-Y-1803, fig. 2
	80-B-44	3/12/19	" " "
	80-B-47	3/12/19	38-Y-1862, A
	97-B-22	3/12/19	38-Y-1803, fig. 2
Toll Switching	68-B-50	3/12/19	38-Y-1850, B

NO. 9-C SWITCHBOARD

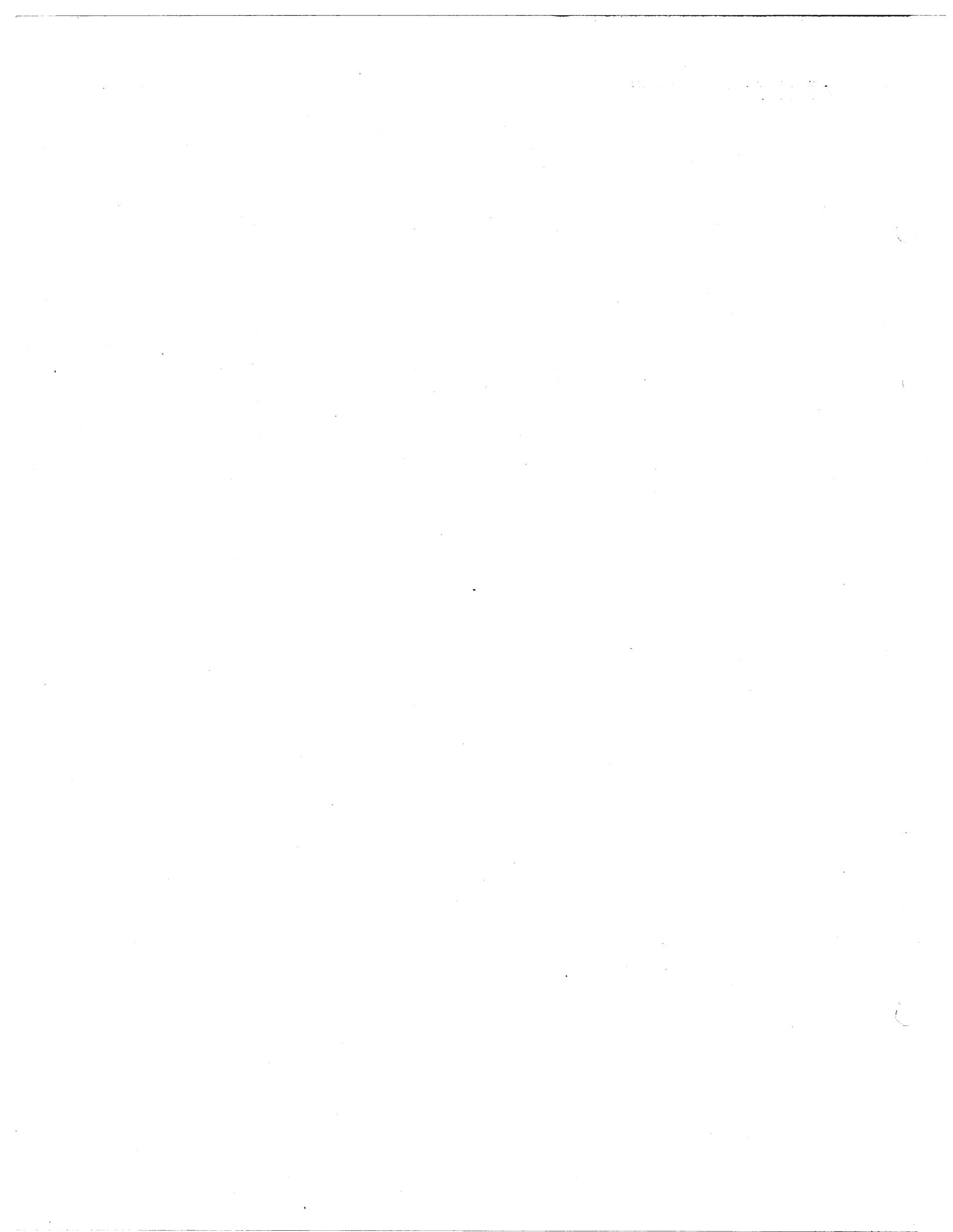
Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Call Circuits			
Regular	162-B-48	2	38-Y-1889, fig. 1
Cords			
Subscribers'	77-B-35	19	38-Y-1828, fig. 2
	86-B-37	9/2/14	" " "
	150-B-27	16	38-Y-1829, fig. 2
	172-B-2	8	38-Y-1828, fig. 2
	172-B-10	6	38-Y-1829, fig. 2
Repeater	134-AX-6	9	38-Y-1884, fig. 1
	134-AX-11	3	" " "
Universal	93-B-8	2/4/19	38-Y-1828, fig. 2
			38-Y-1830, fig. 1
			38-Y-1809, fig. 1
	94-B-5	14	38-Y-1809, fig. 1
			38-Y-1828, fig. 2
			38-Y-1830, fig. 1
	153-B-14	3	38-Y-1869, fig. 1
	153-B-15	3	38-Y-1869, fig. 1
			38-Y-1842
	167-B-35	15	38-Y-1869, fig. 1
	167-B-36	15	38-Y-1842
			38-Y-1869, fig. 1
	174-B-19	11	38-Y-1869, fig. 1
Semi-Universal	153-B-16	3	38-Y-1842
			38-Y-1869, fig. 2
	153-B-17	3	38-Y-1869, fig. 2
	167-B-37	14	38-Y-1842
			38-Y-1869, fig. 2
	167-B-38	14	38-Y-1869, fig. 2
Line Circuits			
Subscribers'	149-B-48	4	38-Y-1819, fig. 1
			38-Y-1858
Toll	150-B-28	4	38-Y-1804
	169-B-26	6	38-Y-1806
	169-B-30	7	"
Operators' Telephone			
Subscribers'	77-B-36	6/24/12	38-Y-1906, fig. 2
	87-B-28	4	38-Y-1899, fig. 1, A & B
	150-B-48	4	" " " "
	159-B-13	4	" " " "
Trunk	87-B-26	6	38-Y-1901
	181-B-44	6	"

No. 9-C Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Operators' Telephone (Cont'd) Combined Subscribers' & Trunk	90-B-17	5	38-Y-1901 38-Y-1899, fig. 1, A & B 38-Y-1902 38-Y-1901
	154-B-9	4	38-Y-1907, fig. 1, A & B 38-Y-1899, fig. 1, A & B
	163-B-16	2	38-Y-1902
		4	38-Y-1901
	170-B-35	10	38-Y-1902
	170-B-37	5	38-Y-1901 38-Y-1902 38-Y-1901
Toll	152-B-2	5	38-Y-1899, fig. 1, A & B
	167-B-41	7	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A & B
	174-B-41	4	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A & B
	177-B-51	6	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A & B
Supervisors'	153-B-28	6	38-Y-1895, fig. 2
Trunks Incoming Call Circuit	71-B-7	15	38-Y-1870, fig. 1
		20	38-Y-1870, fig. 2
	114-B-2	3/7/13	38-Y-1875
		15	38-Y-1866, B
	153-B-23	6	38-Y-1870, fig. 1
	159-B-20	4	" " "
		12	38-Y-1870, fig. 2
Incoming Call Wireless	153-B-43	16	38-Y-1866, C
	153-B-46	4	38-Y-1876, B
		7	38-Y-1866, C
	159-B-21	10	" "
Outgoing	154-B-10	6	38-Y-1859
	163-B-5	2	38-Y-1889, fig.1
	177-B-15	4	38-Y-1800, fig. 2
Recording	150-B-45	5	38-Y-1806
		6	38-Y-1819, fig. 2
	150-B-46	6	38-Y-1806
Ringdown (Two-way)	87-B-25	12	38-Y-1871
	90-B-18	16	38-Y-1859
	126-B-11	7	"
Toll Switching	90-B-20	10/27/15	38-Y-1876, A
	112-B-30	5	" "
	154-B-43	11	38-Y-1848

No. 9-C Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Trunks (Cont'd)			
Toll Switching (Cont'd)	154-B-44	6	38-Y-1848
	154-B-45	12	"
	154-B-49	6	"
	164-B-47	7	"
	164-B-49	9	"
Toll Switching (Call Wireless)	92-B-28	10/27/15	38-Y-1876, A
	94-B-16	10/27/15	" "
	154-B-47	13	38-Y-1848
	154-B-48	6	"
	155-B-28	15	"
	155-B-31	7	"
	164-B-48	9	"
	164-B-50	10	"



NO. 9-D SWITCHBOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Cords			
Subscribers'	61-B-38	10/22/19	38-Y-1828, fig. 2
Toll	185-B-46	3	38-Y-1881, fig. 1 38-Y-1806
Universal	63-B-1	10/22/19	38-Y-1852, A 38-Y-1851, C 38-Y-1846, fig. 2 38-Y-1842 38-Y-1869, fig. 1 38-Y-1869, fig. 1 38-Y-1828, fig. 1 38-Y-1828, fig. 2 38-Y-1825, fig. 1 38-Y-1809, fig. 1 38-Y-1828, fig. 2 38-Y-1830, fig. 1
	69-B-24	10/22/19	
	69-B-30	10/22/19	
	92-B-29	10/22/19	
	94-B-6	5/3/12	
Semi-Universal	69-B-31	10/22/19	38-Y-1842 38-Y-1869, fig. 2 38-Y-1869, fig. 2
	69-B-32	10/22/19	
Line Circuits			
Subscribers'	150-B-10	10/4/12	38-Y-1819, fig. 1
Toll	61-B-33	6/19/12	38-Y-1804
Operators' Telephone			
Subscribers'	61-B-37	6/24/12	38-Y-1906, fig. 2
	87-B-20	6/24/12	38-Y-1899, fig. 1, A
Toll	153-B-42	5	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A
Supervisors'			
	90-B-27	1/13/13	38-Y-1895, fig. 2
	140-B-35	5/29/12	38-Y-1907, fig. 2, A & B
Trunks			
Incoming Call Circuit	114-B-13	10/21/12	38-Y-1872, A
Local	62-B-14	10/21/12	38-Y-1806
Recording	93-B-47	7/18/12	38-Y-1806
Ringdown (Two-way)	92-B-44	3/28/13	38-Y-1844
	136-B-28	1/28/19	38-Y-1859
Toll Switching	110-B-48	10/22/19	38-Y-1875
Toll Switching (Call Wireless)	136-B-6	10/22/19	38-Y-1875
	139-B-11	10/22/19	"

NO. 10 SWITCHBOARD

Type of Circuit	A. T. & T. CO. Dwg. No.	Issue No.	Transmission Circuit Dwg. No.
Call Circuits			
Regular	162-B-47	3	38-Y-1889, fig. 1
Emergency	170-B-1	4	38-Y-1844
	170-B-21	5	38-Y-1800, fig. 1
Cords			
Subscribers'	107-B-14	3	38-Y-1878
	107-B-22	17	"
	172-B-1	3	"
	172-B-9	3	"
Toll	136-A-31	4	38-Y-1866, A 38-Y-1849 38-Y-1843, fig. 1
	180-B-25	5	38-Y-1843, fig. 1 38-Y-1866, A
	180-B-26	4	38-Y-1843, fig. 1 38-Y-1866, A
Universal	107-B-4	5	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	107-B-25	1/11/15	38-Y-1842 38-Y-1851, C 38-Y-1852, A
	107-B-26	1/11/15	38-Y-1846, fig. 2 38-Y-1851, C 38-Y-1852, A
	162-B-40	10	38-Y-1842 38-Y-1849 38-Y-1847
Semi-Universal	107-B-23	1/11/15	38-Y-1846, fig. 2 38-Y-1851, C
	107-B-24	1/11/15	38-Y-1842 38-Y-1851, C
	123-B-13	1/11/15	38-Y-1842 38-Y-1851, C
	162-B-41	9	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	162-B-42	6	38-Y-1842 38-Y-1847
	162-B-43	6	38-Y-1846, fig. 2 38-Y-1847
	162-B-44	5	38-Y-1842 38-Y-1847

No. 10 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Line Circuits			
Long	114-B-34	4/30/18	38-Y-1803, fig. 1, A
	120-B-32	4/30/18	38-Y-1803, fig. 1, B
Subscribers'	150-B-1	4	38-Y-1919, fig. 1 38-Y-1858
Toll	169-B-25	3	38-Y-1806
	169-B-27	3	"
Operators' Telephone			
Subscribers'	107-B-43	7	38-Y-1899, fig. 1, A & B
	118-B-50	1/5/17	" " " "
	158-B-39	4	" " " "
	158-B-41	4	" " " "
Trunk	107-B-49	14	38-Y-1901
Combined Subscribers' and Trunk			
	121-A-48	6	38-Y-1901 38-Y-1902
	107-B-42	3/7/19	38-Y-1899, fig. 1, A & B 38-Y-1901
	121-B-19	14	38-Y-1901 38-Y-1902
	153-B-18	6/26/13	38-Y-1901 38-Y-1902
	158-B-40	4	38-Y-1901 38-Y-1902
	180-B-67	7	38-Y-1901 38-Y-1902
Toll	107-B-50	3/7/19	38-Y-1893, fig. 1, A 38-Y-1899, fig. 1, A & B
	150-B-32	9	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A & B
	158-B-42	4	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A & B
	164-B-38	5	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A & B
Supervisors'			
	118-A-26	9	38-Y-1907, fig. 2, A & B
	107-B-37	5/29/12	38-Y-1895, fig. 2
	140-B-35	5/29/12	38-Y-1907, fig. 2, A & B
	150-B-9	5	38-Y-1895, fig. 2
Trunks			
Incoming Call Circuit	107-B-13	11/3/16	38-Y-1872, A
		12/12/17	38-Y-1874, A

No. 10 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.	
	Dwg. No.	Issue No.		
Trunks (Cont'd)				
Incoming Call Circuit (Cont'd)	107-B-41	7	38-Y-1872, A	
		9	38-Y-1874, A	
		11	38-Y-1873	
	120-B-31	15	38-Y-1875	
	159-B-5	7	38-Y-1872, A	
	181-B-99	3	38-Y-1883	
Local	135-B-20	10	38-Y-1802	
Outgoing	154-B-13	4	38-Y-1859	
	163-B-2	4	38-Y-1887, fig. 1	
				38-Y-1890
	163-B-3	3	38-Y-1886, fig. 2	
			38-Y-1889, fig. 2	
	163-B-4	3	38-Y-1889, fig. 1	
181-B-100	3	38-Y-1882		
Recording	150-B-3	5	38-Y-1801, fig. 1	
	166-B-20	3	38-Y-1800, fig. 2	
	166-B-25	1	38-Y-1887, fig. 1	
				38-Y-1890
		4	38-Y-1891, fig. 1	
			38-Y-1891, fig. 2	
Ringdown (Two-way)	107-B-12	10/3/14	38-Y-1856	
	107-B-28	4/30/18	38-Y-1871	
	107-B-29	4/30/18	"	
	124-B-36	4/30/18	38-Y-1803, fig. 1, B	
	124-B-37	4/30/18	38-Y-1856	
	124-B-38	4	38-Y-1803, fig. 1, B	
	126-B-23	4/30/18	38-Y-1856	
	129-B-14	5/13/12	38-Y-1871	
	131-B-10	5/13/12	"	
	135-B-22	10/10/12	38-Y-1859	
	135-B-30	4/30/18	38-Y-1871	
	135-B-32	10/4/12	38-Y-1867, fig. 1, A	
	137-B-46	4/30/18	38-Y-1861, fig. 1	
	139-B-40	4/30/18	38-Y-1871	
	139-B-41	4/30/18	38-Y-1861, fig. 1	
	169-B-20		3	38-Y-1856
				38-Y-1861, fig. 2
	Toll Switching	107-B-11	6/26/13	38-Y-1876, A
		107-B-40	6/26/13	" "
		118-B-11	4/30/18	38-Y-1860, fig. 2
118-B-12		4/30/18	" "	
135-B-42		9/25/12	38-Y-1875	
139-B-49		9/25/12	"	

No. 10 Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Trunks (Cont'd)			
Toll Switching (Cont'd)	153-B-32	11/3/16	38-Y-1848
	153-B-33	4	"
	154-B-25	6	"
	154-B-26	6	"
	159-B-1	4	"
	159-B-2	4	"
Toll Switching (Call Wireless)	107-B-38	5/13/12	38-Y-1876, A
	107-B-39	6/26/13	" "
	145-B-27	16	38-Y-1848
	153-B-31	9/10/17	"
	154-B-24	6	"
	154-B-27	5	"
	172-B-14	5	"
	172-B-15	6	"

MAGNETO SWITCHBOARDS

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
	No. 105		
Cords	65-B-14	9/28/15	38-Y-1804 38-Y-1880, A
Operators' Telephone	65-B-19	9/28/15	38-Y-1893, fig. 1, B 38-Y-1894
	No. 105-A		
Cords	152-B-34	6	38-Y-1880, A 38-Y-1804
		8	38-Y-1880, B 38-Y-1811, fig. 1
		15	38-Y-1804 38-Y-1880, A
	178-B-93	7	38-Y-1806 38-Y-1880, A
Operators' Telephone	152-B-35	6	38-Y-1893, fig. 1, B 38-Y-1900, fig. 2
	174-B-48	9	38-Y-1892, fig. 2, B 38-Y-1900, fig. 2
Trunks	152-B-36	5	38-Y-1844
	178-B-19	4	38-Y-1863, fig. 2, A 38-Y-1881
	No. 105-B		
Cords	155-B-43	5	38-Y-1880, A 38-Y-1804
		6	38-Y-1880, B 38-Y-1811, fig. 1
		12	38-Y-1880, A 38-Y-1804
	179-B-2	6	38-Y-1880, A 38-Y-1806
Operators' Telephone	155-B-40	5	38-Y-1893, fig. 1, B 38-Y-1900, fig. 2
	175-B-22	8	38-Y-1892, fig. 2, B 38-Y-1900, fig. 2
Trunks	160-B-7	5	38-Y-1844
	179-B-9	2	38-Y-1863, fig. 2, A 38-Y-1881



NO. 1 TOLL SWITCHBOARD

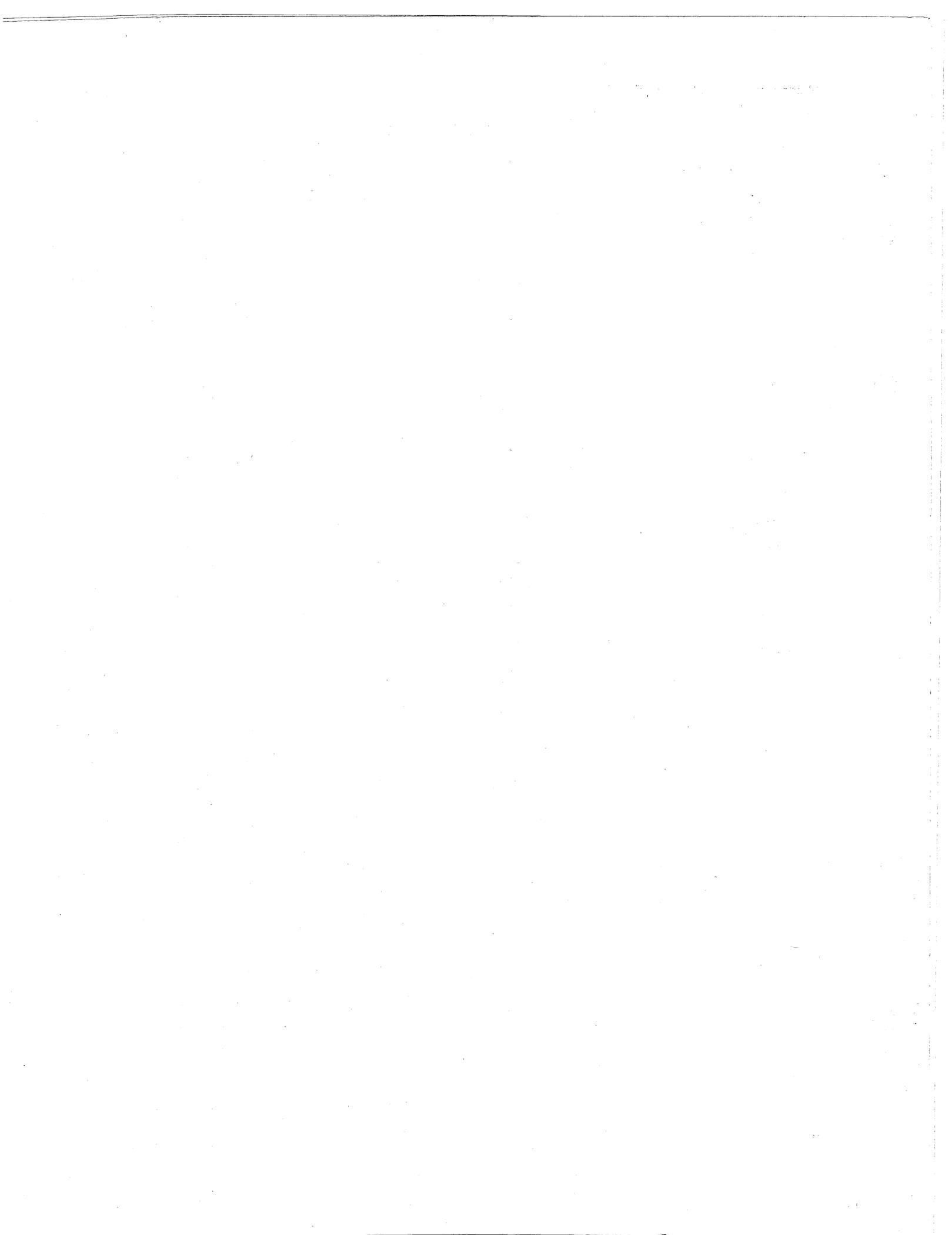
Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Call Circuits			
Regular	162-B-50	3	38-Y-1889, fig. 1
Emergency	143-B-41	11	38-Y-1844
Cords			
Recording	61-B-47	12/17/12	38-Y-1819, fig. 1 38-Y-1824, fig. 2
	63-B-24	12/17/12	38-Y-1819, fig. 1 38-Y-1824, fig. 2
	90-B-15	12/18/12	38-Y-1804
	110-B-28	10/3/13	38-Y-1831, fig. 2
	137-B-14	8/6/14	38-Y-1824, fig. 2
	143-B-11	10/3/13	38-Y-1824, fig. 2 38-Y-1827, fig. 1
	166-B-33	17	38-Y-1827, fig. 2 38-Y-1825, fig. 2
	166-B-34	16	38-Y-1825, fig. 2
Repeater	133-AX-10	5	38-Y-1884, fig. 1
	133-AX-11	5	" " "
	133-AX-24	4	" " "
	134-AX-1	11	" " "
	134-AX-20	5	" " "
Terminating	66-B-42	5/21/17	38-Y-1814, fig. 2
	108-B-38	6	38-Y-1809, fig. 2
	143-B-31	11/6/13	38-Y-1813, fig. 2
	149-B-3	11/6/13	38-Y-1813, fig. 2 38-Y-1822, fig. 2
	157-B-24	6	38-Y-1813, fig. 1
	157-B-32	5	38-Y-1813, fig. 1 38-Y-1822, fig. 2
	161-B-35	14	38-Y-1813, fig. 1 38-Y-1822, fig. 2
	168-B-7	13	38-Y-1822, fig. 2
	172-B-26	10	38-Y-1813, fig. 1
	172-B-27	8	" " "
	191-B-81	1	" " "
Through	143-B-21	11/6/13	38-Y-1810, fig. 2
	143-B-30	7/19/12	" " "
	157-B-23	6	38-Y-1806
	175-B-43	8	"
Through and Terminating	53-B-16	10/3/13	38-Y-1826, fig. 1
	53-B-44	10/3/13	" " "
	71-B-48	7/21/11	" " "
	108-B-6	13	38-Y-1830, fig. 2
	108-B-40	2/26/13	38-Y-1830, fig. 2
	110-B-35	5/21/17	38-Y-1814, fig. 1

No. 1 Toll Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Cords (Cont'd)			
Through and Terminating (Cont'd)	137-B-10	9	38-Y-1830, fig. 2 38-Y-1829, fig. 1
	140-B-19	11	38-Y-1826, fig. 1
	143-B-20	11/6/13	38-Y-1810, fig. 2 38-Y-1813, fig. 2
	157-B-22	6	38-Y-1813, fig. 1 38-Y-1806
	172-B-24	10	38-Y-1813, fig. 1 38-Y-1806
	172-B-25	10	38-Y-1813, fig. 1 38-Y-1806
	180-B-75	7	38-Y-1830, fig. 2
	180-B-76	7	" " " "
	180-B-77	8	38-Y-1826, fig. 2
	180-B-78	7	" " " "
	191-B-82	1	38-Y-1813, fig. 1 38-Y-1806
Line Circuits			
Subscribers'	140-A-47	3	38-Y-1848
	63-B-19	12/17/12	38-Y-1803, fig. 2
	132-B-50	7/28/14	38-Y-1873
	139-B-15	9/3/15	38-Y-1860, fig. 2
	170-B-31	12	38-Y-1848
Toll	124-A-29	3	38-Y-1806
	124-A-31	4	"
	61-B-16	7/7/15	38-Y-1804
	80-B-17	1/9/13	38-Y-1853, A
	81-B-10	6/30/17	38-Y-1804
	85-B-40	7/10/15	38-Y-1853, A
	87-B-23	1/9/13	" "
	136-B-19	7/16/12	38-Y-1809, fig. 2
	140-B-39	10/16/13	38-Y-1846, fig. 2
	153-B-38	8	38-Y-1822, fig. 2 38-Y-1876, A
		12	Rating Special
		13	Non-operable
		14	38-Y-1822, fig. 2 38-Y-1847
	153-B-39	14	38-Y-1822, fig. 2
Operators' Telephone Information			
	136-B-49	7	38-Y-1918, fig. 1, AD, BD 38-Y-1893, fig. 1, A
		11	38-Y-1892, fig. 2, A
		12	38-Y-1918, fig. 1, AC, BC 38-Y-1892, fig. 2, A
		15	38-Y-1919, A, B 38-Y-1892, fig. 2, A 38-Y-1918, fig. 1, AC, BC

No. 1 Toll Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Operators' Telephone (Cont'd)			
Recording	53-B-34	10/7/13	38-Y-1910
	61-B-30	9/4/09	38-Y-1919 A
		14	38-Y-1919, A, B
		16	38-Y-1919, A, B, C
		19	38-Y-1918, fig. 1, AC, BC
	128-B-43	5/28/13	38-Y-1919, A, B
			38-Y-1918, fig. 1, AC
	149-B-24	5	38-Y-1919, A, B
		10	38-Y-1919, A, B, C
		16	38-Y-1918, fig. 1, AC, BC
Tandem	170-B-9	12	38-Y-1920, fig. 2
Toll	53-B-36	10/7/13	38-Y-1892, fig. 1
			38-Y-1918, fig. 1, AC
	71-B-46	10/16/14	38-Y-1893, fig. 1, A
			38-Y-1918, fig. 1, AC, BC
	142-B-25	2/5/10	38-Y-1893, fig. 1, B
			38-Y-1918, fig. 1, AC, BC
		9/25/12	38-Y-1892, fig. 2, A
			38-Y-1918, fig. 1, AC, BC
	142-B-47	7/9/12	38-Y-1892, fig. 2, A
			38-Y-1918, fig. 1, AC, BC
	143-B-14	10/16/14	38-Y-1893, fig. 1, A
			38-Y-1918, fig. 1, AC, BC
	145-B-44	20	38-Y-1892, fig. 2, A
			38-Y-1918, fig. 1, AC, BC
	149-B-19	15	38-Y-1918, fig. 1, AC, BC
			38-Y-1892, fig. 2, A
	149-B-34	14	38-Y-1892, fig. 2, A
			38-Y-1918, fig. 1, AC, BC
	174-B-47	5	38-Y-1892, fig. 2, A
			38-Y-1918, fig. 1, AC, BC
Supervisors'			
	52-B-29	6/18/19	38-Y-1907, fig. 1, A
			38-Y-1893, fig. 1, A
	52-B-30	11/8/12	38-Y-1909, fig. 1
	110-B-8	20	38-Y-1911, fig. 2
	110-B-11	9/25/22	38-Y-1893, fig. 1, A
			38-Y-1910
	137-B-13	11/26/12	38-Y-1911, fig. 2
Trunks			
Local	53-B-27	12/18/12	38-Y-1804
	77-B-12	6/8/23	38-Y-1865, fig. 2
	81-B-23	6/8/23	38-Y-1844



NO. 2 TOLL SWITCHBOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Call Circuits			
Regular	163-B-1	3	38-Y-1889, fig. 1
Emergency	167-B-46	4	38-Y-1844
Cords			
Through and Terminating	118-A-10	6	38-Y-1842 38-Y-1854, B 38-Y-1855, fig. 1
	118-A-11	7	38-Y-1854, B 38-Y-1855, fig. 1
	121-A-1	6	38-Y-1842 38-Y-1854, B 38-Y-1855, fig. 1
	121-A-2	6	38-Y-1854, B 38-Y-1855, fig. 1
	136-A-32	6	38-Y-1846, fig. 2 38-Y-1843, fig. 1 38-Y-1849 38-Y-1866, A
	140-A-48	3	38-Y-1849 38-Y-1866, A 38-Y-1843, fig. 1
	55-B-12	7/10/19	38-Y-1804 38-Y-1884, fig. 2
	69-B-25	7/21/19	38-Y-1842 38-Y-1854, A 38-Y-1855, fig. 1
	70-B-1	7/23/19	38-Y-1846, fig. 2 38-Y-1854, A 38-Y-1855, fig. 1
	70-B-4	7/23/19	38-Y-1853, B 38-Y-1858
	70-B-5	7/23/19	38-Y-1842 38-Y-1853, B
	80-B-5	7/31/19	38-Y-1842 38-Y-1871
	80-B-6	7/31/19	38-Y-1847 38-Y-1858
	80-B-38	7/31/19	38-Y-1842 38-Y-1854, B 38-Y-1855, fig. 1
	81-B-7	7/31/19	38-Y-1846, fig. 2 38-Y-1854, B 38-Y-1855, fig. 1
	83-B-21	7/31/19	38-Y-1842 38-Y-1854, B 38-Y-1855, fig. 1
	83-B-22	7/31/19	38-Y-1846, fig. 2 38-Y-1854, B 38-Y-1855, fig. 1

No. 2 Toll Switchboard (Cont'd)

Type of Circuit Cords (Cont'd)	A. T. & T. CO.		Transmission
	Dwg. No.	Issue No.	Circuit Dwg. No.
Through and Terminating (Cont'd)	83-B-50	7/31/19	38-Y-1842 38-Y-1847
	85-B-1	8/22/19	38-Y-1847 38-Y-1858
	86-B-10	8/22/19	38-Y-1842 38-Y-1847 38-Y-1849
	86-B-11	8/22/19	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	118-B-3	7	38-Y-1842 38-Y-1847
	128-B-35	13	38-Y-1842 38-Y-1847
	128-B-36	14	38-Y-1847 38-Y-1858
	128-B-37	6/19/12	38-Y-1842 38-Y-1854, B
	128-B-38	9/16/19	38-Y-1855, fig. 1 38-Y-1846, fig. 2 38-Y-1854, B 38-Y-1855, fig. 1
	154-B-37	9	38-Y-1842 38-Y-1847
	154-B-38	12	38-Y-1847 38-Y-1858
	160-B-44	11	38-Y-1847 38-Y-1846, fig. 2
		13	38-Y-1847 38-Y-1855, fig. 2, A
	161-B-3	8	38-Y-1847 38-Y-1858
	161-B-4	6	38-Y-1842 38-Y-1847
	161-B-5	8	38-Y-1847 38-Y-1858
	161-B-6	9	38-Y-1846, fig. 2 38-Y-1847
	162-B-45	8	38-Y-1847 38-Y-1849
	170-B-29	5	38-Y-1855, fig. 2, A & B 38-Y-1842 38-Y-1847
	170-B-30	6	38-Y-1849 38-Y-1846, fig. 2 38-Y-1847
	170-B-40	5	38-Y-1849 38-Y-1842 38-Y-1847 38-Y-1849

No. 2 Toll Switchboard (Cont'd)

Type of Circuit	A. T. & T. CO. Dwg. No.	Issue No.	Transmission Circuit Dwg. No.
Cords (Cont'd)			
Through and Terminating (Cont'd)	170-B-41	6	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	180-B-23	6	38-Y-1843, fig. 1 38-Y-1866, A
	180-B-24	5	38-Y-1843, fig. 1 38-Y-1866, A
	189-B-85	3	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	189-B-87	2	38-Y-1846, fig. 2 38-Y-1847 38-Y-1849
	192-B-64	2	38-Y-1846, fig. 2 38-Y-1847
Line Circuits			
Toll	124-A-30	6	38-Y-1806
	124-A-32	7	"
	59-B-50	7/7/15	38-Y-1804
	88-B-28	3	"
Operators' Telephone			
	53-B-13	10/7/18	38-Y-1893, fig. 1, A 38-Y-1918, fig. 1, AC, BC
	56-B-36	7/16/19	38-Y-1892, fig. 1 38-Y-1918, fig. 1, AC, BC
	71-B-49	7/23/19	38-Y-1893, fig. 1, A 38-Y-1918, fig. 1, AC, BC
	71-B-50	11/29/05	38-Y-1893, fig. 1, A 38-Y-1918, fig. 1, A & B
	94-B-30	7/2/13	38-Y-1893, fig. 1, A 38-Y-1918, fig. 1, AC, BC
	94-B-31	7/2/13	38-Y-1893, fig. 1, A 38-Y-1918, fig. 1, AC, BC
	128-B-39	5	38-Y-1893, fig. 1, A 38-Y-1918, fig. 1, AC, BC
	128-B-40	3/16/15	38-Y-1893, fig. 1, A 38-Y-1918, fig. 1, AC, BC
	168-B-19	7	38-Y-1892, fig. 2, A 38-Y-1918, fig. 1, AC, BC
	172-B-42	5	38-Y-1892, fig. 2, A 38-Y-1918, fig. 1, AC, BC
Trunks			
	58-B-25	6/25/17	38-Y-1801, fig. 1
	59-B-36	6/25/17	" " "
	168-B-43	5	" " "
	169-B-23	2	" " "



OPERATING ROOM DESKS, TURRETS, ETC.

Type of Circuit	A. T. & T. CO. Dwg. No.	Issue No.	Transmission Circuit Dwg. No.
LOCAL			
C. O. Instructor's Set			
	186-B-39	5	38-Y-1892, fig. 2, A
	Chief Operator's Desk No. 2		
	69-B-46	1/14/13	38-Y-1815, fig. 2
	Chief Operator's Desk No. 3		
Operators' Telephone	68-B-19	5/20/11	38-Y-1893, fig. 1, A 38-Y-1907, fig. 1, A & B
Trunks	70-B-44	3/27/16	38-Y-1806
	Chief Operator's Desk No. 5		
Cords	58-B-29	7/16/19	38-Y-1801, fig. 2
Operators' Telephone	58-B-27	7/16/19	38-Y-1893, fig. 1, A 38-Y-1907, fig. 1, A
	Chief Operator's Desk No. 6-C		
Operators' Telephone	77-B-41	5/25/16	38-Y-1893, fig. 1, A 38-Y-1899, fig. 1, A
	Chief Operator's Desk No. 6-D		
Cords	66-B-23	6/25/12	38-Y-1804
	66-B-24	6/25/12	"
Operators' Telephone	66-B-25	6/25/12	38-Y-1893, fig. 1, A 38-Y-1899, fig. 1, A
Trunks	65-B-44	5/13/12	38-Y-1806
	Chief Operator's and Manager's Desk No. 7		
Trunks	157-B-43	3	38-Y-1819, fig. 1
	Chief Operator's Desk No. 10		
Trunks	112-B-5	4/30/18	38-Y-1806
	No. 13 Key Cabinet		
Operators' Telephone	177-B-72	5	38-Y-1907, fig. 1, A 38-Y-1911, fig. 1
	182-B-95	5	38-Y-1911, fig. 1 38-Y-1907, fig. 1, A
Tie Lines	182-B-97	3	38-Y-1807, fig. 2
	182-B-99	3	" " "

Oper. Rm. Desks, Turrets, Etc. (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
	No. 13 Key Cabinet (Cont'd)		
Trunks	182-B-96	2	38-Y-1807, fig. 2
	182-B-98	3	" " "
	182-B-100	3	" " "
	No. 14-L Turret		
Operators' Telephone	182-B-22	6	38-Y-1892, fig. 2, A 38-Y-1911, fig. 1
	182-B-89	7	38-Y-1892, fig. 2, A 38-Y-1911, fig. 1
	182-B-92	5	38-Y-1892, fig. 2, A 38-Y-1911, fig. 1
Tie Lines	182-B-14	4	38-Y-1807, fig. 2
	182-B-94	4	" " "
Trunks	182-B-15	3	38-Y-1807, fig. 2
	182-B-83	2	38-Y-1800, fig. 1
	182-B-85	2	38-Y-1807, fig. 2
	182-B-93	4	" " "
	184-B-28	1	38-Y-1851, A
	184-B-30	2	" " "
	No. 15-L Turret		
Operators' Telephone	182-B-21	7	38-Y-1892, fig. 2, A 38-Y-1911, fig. 1
	182-B-91	5	38-Y-1892, fig. 2, A 38-Y-1911, fig. 1
Tie Lines	182-B-13	4	38-Y-1807, fig. 2
Trunks	182-B-16	3	38-Y-1807, fig. 2
	182-B-82	3	38-Y-1800, fig. 1
	182-B-86	2	38-Y-1807, fig. 2
	No. 16 Desk		
Cords	182-B-45	4	38-Y-1859
Operators' Telephone	182-B-44	8	38-Y-1892, fig. 2, A 38-Y-1911, fig. 1 38-Y-1923, fig. 1
	182-B-64	8	38-Y-1892, fig. 2, A 38-Y-1911, fig. 1 38-Y-1923, fig. 1
Tie Lines	182-B-51	3	38-Y-1844
	182-B-52	3	"
	182-B-53	4	38-Y-1803, fig. 2

Oper. Rm. Desks, Turrets, Etc. (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
No. 16 Desk (Cont'd)			
Trunks	182-B-57	2	38-Y-1818, fig. 1
	182-B-84	2	38-Y-1800, fig. 1
	184-B-29	1	38-Y-1851, A
	184-B-31	2	" "
No. 17 Desk			
Cords	182-B-63	4	38-Y-1859
Operators' Telephone	182-B-65	7	38-Y-1921, fig. 1 38-Y-1923, fig. 2
	182-B-73	5	38-Y-1923, fig. 2 38-Y-1921, fig. 1
Tie Lines	182-B-66	3	38-Y-1844
	182-B-67	4	38-Y-1803, fig. 2
	182-B-68	3	38-Y-1844
Trunks	182-B-90	2	38-Y-1851, A
Central Inf. Desk No. 1			
Cords	178-B-33	4	38-Y-1803, fig. 2
Operators' Telephone	171-B-3	3	38-Y-1920, fig. 1
	178-B-35	6	38-Y-1910 38-Y-1908, fig. 1
Supervisors'	172-B-35	2	38-Y-1895, fig. 2
	178-B-34	5	38-Y-1914, fig. 1
Trunks	172-B-48	2	38-Y-1804 38-Y-1805, fig. 2
	178-B-32	3	38-Y-1810, fig. 1
Information Desk No. 5			
Operators' Telephone	65-B-48	1/29/20	38-Y-1893, fig. 1, A 38-Y-1907, fig. 1, A & B
Trunks	61-B-12	4/14/16	38-Y-1806
	157-B-49	2	38-Y-1857
	157-B-50	2	38-Y-1858
Miscellaneous Desks			
Cords	62-B-6	4/8/11	38-Y-1878
	74-B-21	3	"
	107-B-44	4/30/18	38-Y-1804
	107-B-45	4/30/18	"
	114-B-10	3	38-Y-1878

Oper. Rm. Desks, Turrets, Etc. (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.	
	Dwg. No.	Issue No.		
	Miscellaneous Desks (Cont'd)			
Operators' Telephone	53-B-10	10/7/18	38-Y-1893, fig. 1, A 38-Y-1907, fig. 1, A	
	61-B-7	3/27/23	38-Y-1907, fig. 2, B	
	61-B-8	4	38-Y-1910	
	61-B-14	11/19/14	38-Y-1893, fig. 1, A 38-Y-1893, fig. 1, A 38-Y-1910	
	62-B-9	1/3/12	38-Y-1907, fig. 1, A & B 38-Y-1893, fig. 1, A	
	107-B-47	4/30/18	38-Y-1893, fig. 1, A 38-Y-1899, fig. 1, A	
	137-B-36	12/15/19	38-Y-1917, fig. 1	
	168-B-25	7	38-Y-1892, fig. 2 38-Y-1907, fig. 2, B	
	Trunks	61-B-5	7/17/19	38-Y-1806
		61-B-10	1/17/19	"
62-B-19		9	38-Y-1802, fig. 2 38-Y-1800, fig. 1	
66-B-43		1/17/19	38-Y-1807, fig. 1	

TOLL

Ticket Filing and Rate Quoting Desks			
Operators' Telephone	128-B-21	9	38-Y-1910 38-Y-1908, fig. 2
	183-B-36	3	38-Y-1907, fig. 1, A
Directory Desks			
Operators' Telephone	128-B-21	9	38-Y-1910 38-Y-1908, fig. 2
	181-B-90	6	38-Y-1907, fig. 1, A & B
Trunks	181-B-88	4	38-Y-1803, fig. 1
		5	38-Y-1816, fig. 2 38-Y-1800, fig. 1
No. 14-T Turret			
Operators' Telephone	182-B-23	4	38-Y-1892, fig. 2, A 38-Y-1919, A 38-Y-1910
Trunks	182-B-29	6	38-Y-1822, fig. 2
No. 15-T Turret			
Operators' Telephone	182-B-24	4	38-Y-1892, fig. 2, A 38-Y-1919, A 38-Y-1910

Oper. Rm. Desks, Turrets, Etc. (Cont'd)

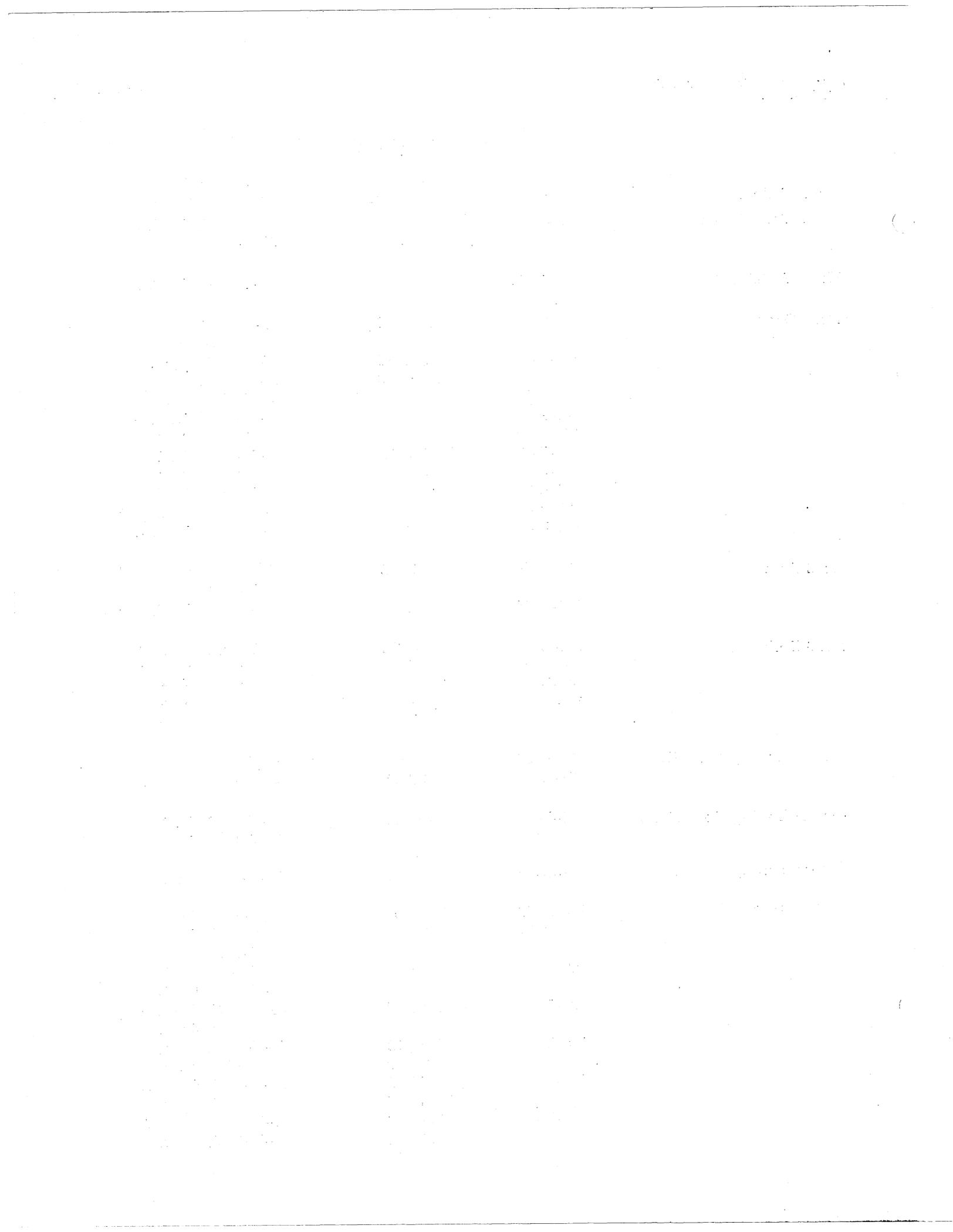
Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
	No. 15-T Turret (Cont'd)		
Trunks	182-B-34	6	38-Y-1822, fig. 2
	No. 18-T Turret		
Operators' Telephone	182-B-38	4	38-Y-1892, fig. 2, A 38-Y-1919, A 38-Y-1910
Trunks	182-B-40	6	38-Y-1822, fig. 2
	Chief Operator's Desk No. 2		
Operators' Telephone	53-B-46	7/9/19	38-Y-1893, fig. 1, A 38-Y-1907, fig. 1, A
	69-B-45	4/11/12	38-Y-1893, fig. 1, A 38-Y-1907, fig. 1, A & B
	80-B-39	4/11/12	38-Y-1893, fig. 1, A 38-Y-1907, fig. 1, A & B
	Ticket Writing Desk		
Operators' Telephone	128-B-27	10/8/12	38-Y-1907, fig. 1, B

Item No.	Description	Quantity	Unit Price	Total Price
1	Item 1 Description	100	1.00	100.00
2	Item 2 Description	200	2.00	400.00
3	Item 3 Description	300	3.00	900.00
4	Item 4 Description	400	4.00	1600.00
5	Item 5 Description	500	5.00	2500.00
6	Item 6 Description	600	6.00	3600.00
7	Item 7 Description	700	7.00	4900.00
8	Item 8 Description	800	8.00	6400.00
9	Item 9 Description	900	9.00	8100.00
10	Item 10 Description	1000	10.00	10000.00

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SERVICE OBSERVING

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
No. 1 Portable Set	63-B-30	13	38-Y-1892, fig. 2, A
	63-B-31	2	38-Y-1804
No. 2 Portable Set	155-B-22	5	38-Y-1892, fig. 2, A
No. 1 Desk	110-A-9	9/19/12	38-Y-1862, A
			38-Y-1892, fig. 2, A
	118-A-39	12/18/12	38-Y-1892, fig. 2, A
	118-A-45	12/31/12	38-Y-1862, A
			38-Y-1844
	122-A-38	12	38-Y-1892, fig. 2, A
	129-A-33	6	" " " "
	142-B-7	2/3/19	38-Y-1877, fig. 1
	142-B-9	8/1/11	" " "
	152-B-44	12	38-Y-1892, fig. 2, A
	152-B-46	7	38-Y-1817, fig. 2, A & B
	160-B-33	4	38-Y-1892, fig. 2, A
	No. 2 Desk	118-A-36	12/31/12
			38-Y-1844
	152-B-25	4	38-Y-1817, fig. 2, A & B
No. 3 Desk	118-A-40	12/18/12	38-Y-1892, fig. 2, A
	124-A-27	9	" " " "
	149-B-23	12/18/12	" " " "
	152-B-32	8	" " " "
	169-B-4	5	38-Y-1885, fig. 2
Service Testing Desk No. 1	63-B-28	2/24/19	38-Y-1913, fig. 2
	81-B-42	8/7/11	38-Y-1910
Service Testing Desk No. 2	66-B-8	8/7/11	38-Y-1912, fig. 1
			38-Y-1916, fig. 1
Service Testing Desk No. 3	131-B-32	9/26/12	38-Y-1912, fig. 1
Miscellaneous Sets	118-A-37	11/13/12	38-Y-1892, fig. 2, A
	61-B-14	11/19/14	38-Y-1893, fig. 1, A
			38-Y-1910
	69-B-36	5	38-Y-1893, fig. 1, A
			38-Y-1907, fig. 1, A
	108-B-43	7/16/12	38-Y-1893, fig. 1, A
			38-Y-1907, fig. 1, A
	110-B-1	1/26/12	38-Y-1893, fig. 1, A
		9/19/12	38-Y-1892, fig. 2, A
	143-B-50	1/26/12	38-Y-1893, fig. 1, A
	9/19/12	38-Y-1892, fig. 2, A	
149-B-21	2/14/12	38-Y-1893, fig. 1, A	
	9/19/12	38-Y-1892, fig. 2, A	



TERMINAL ROOM DESKS, ETC.

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
	Wire Chief's Desk No. 2		
Cords	51-A-25	11/23/17	38-Y-1915, fig. 1 38-Y-1915, fig. 2
	Wire Chief's Desk No. 7-C		
Cords	77-B-48	7	38-Y-1900, fig. 1 38-Y-1904, fig. 1
	Wire Chief's Desk No. 7-D		
Cord and Telephone	65-B-46	2/8/22	38-Y-1900, fig. 1 38-Y-1904, fig. 1
Trunks	65-B-44	5/13/12	38-Y-1806
	Wire Chief's Desk No. 8		
Telephone	62-A-41	11/23/17	38-Y-1892, fig. 1 38-Y-1922, fig. 1 38-Y-1922, fig. 2
Trunks	72-B-46	11/23/17	38-Y-1805, fig. 2
	Wire Chief's Desk No. 9		
Telephone	62-A-41	11/23/17	38-Y-1892, fig. 1 38-Y-1922, fig. 1 38-Y-1922, fig. 2
	Wire Chief's Desk No. 10		
Cords	93-B-35	3	38-Y-1902 38-Y-1904, fig. 2
Trunks	112-B-5	4/30/18	38-Y-1806
	No. 12 Test Desk		
Telephone	170-B-18	7	38-Y-1910 38-Y-1907, fig. 1, A & B 38-Y-1892, fig. 2, A
	Inspector's Test Table No. 5		
Trunks	55-B-18	11/23/17	38-Y-1807, fig. 1
	Repair Clerk's Desk No. 1		
Telephone	180-B-21	4	38-Y-1910
Trunks	134-A-89	6	38-Y-1806
	Central Cable Location Test Desk No. 1		
Telephone	185-B-13	4	38-Y-1906, fig. 1, A & B
	Jack Panel No. 1		
Telephone	180-B-13	3	38-Y-1892, fig. 2, A 38-Y-1907, fig. 1, A

Year	Month	Day	Time	Location	Remarks
1911	Jan	1	10:00	...	...
1911	Jan	2	10:00	...	...
1911	Jan	3	10:00	...	...
1911	Jan	4	10:00	...	...
1911	Jan	5	10:00	...	...
1911	Jan	6	10:00	...	...
1911	Jan	7	10:00	...	...
1911	Jan	8	10:00	...	...
1911	Jan	9	10:00	...	...
1911	Jan	10	10:00	...	...
1911	Jan	11	10:00	...	...
1911	Jan	12	10:00	...	...
1911	Jan	13	10:00	...	...
1911	Jan	14	10:00	...	...
1911	Jan	15	10:00	...	...
1911	Jan	16	10:00	...	...
1911	Jan	17	10:00	...	...
1911	Jan	18	10:00	...	...
1911	Jan	19	10:00	...	...
1911	Jan	20	10:00	...	...
1911	Jan	21	10:00	...	...
1911	Jan	22	10:00	...	...
1911	Jan	23	10:00	...	...
1911	Jan	24	10:00	...	...
1911	Jan	25	10:00	...	...
1911	Jan	26	10:00	...	...
1911	Jan	27	10:00	...	...
1911	Jan	28	10:00	...	...
1911	Jan	29	10:00	...	...
1911	Jan	30	10:00	...	...
1911	Jan	31	10:00	...	...

NO. 4 TOLL TEST BOARD

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Composite Ringers Portable	132-B-38	8/26/13	38-Y-1812, fig. 1
	158-B-26	3	" " "
	175-B-8	2	" " "
		4	38-Y-1812, fig. 2
		7	38-Y-1812, fig. 1
		9	38-Y-1815, fig. 1
	190-B-79		
Type "A"	124-B-18	10/1/14	38-Y-1812, fig. 1
	149-B-16	7	" " "
	149-B-38	5/10/19	" " "
	160-B-29	12	" " "
		14	38-Y-1812, fig. 2
		17	38-Y-1812, fig. 1
	162-B-2	3	" " "
	164-B-35	6	" " "
	190-B-77	10	38-Y-1815, fig. 1
Type "B"	137-B-11	10/1/14	38-Y-1885, fig. 1
	149-B-17	7	" " "
	149-B-39	5/10/19	" " "
	158-B-21	4	" " "
	158-B-23	5	" " "
	158-B-25	5	" " "
	160-B-30	15	38-Y-1858
	164-B-36	6	"
	190-B-78	9	"
Composite Sets Intermediate	116-A-13	10	38-Y-1832, fig. 2
	180-B-55	6	" " "
Terminal	116-A-12	11	38-Y-1833, fig. 1
	116-A-14	11	" " "
	175-B-10	3	" " "
	180-B-54	6	" " "
Combined Intermediate and Terminal	116-A-8	11	38-Y-1832, fig. 2
			38-Y-1833, fig. 1
	116-A-9	11	38-Y-1833, fig. 1
			38-Y-1832, fig. 2
	180-B-56	8	38-Y-1832, fig. 2
			38-Y-1833, fig. 1
	180-B-57	5	38-Y-1832, fig. 2
	6	38-Y-1833, fig. 1	
		Omitted all apparatus from trans. ckt.	

No. 4 Toll Test Bd. (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Cords			
	63-B-5	7/17/19	38-Y-1806
	124-B-50	10/1/14	38-Y-1807, fig. 1
	135-B-47	11/25/19	38-Y-1854, B
	139-B-12	11/25/19	" "
	145-B-29	7	38-Y-1842
			38-Y-1856
	171-B-39	13	38-Y-1842
			38-Y-1867, fig. 1, B
Line Circuits			
Toll	146-B-21	11	38-Y-1844
	146-B-22	11	"
Operators' Telephone			
	143-B-19	11	38-Y-1918, fig. 1, BC
	145-B-31	14	" " " "
Phantom Sets			
	180-B-61	4	38-Y-1844
	190-B-93	3	38-Y-1886, fig. 1
		4	Made Information
Simplex Sets			
Intermediate	180-B-60	4	38-Y-1844
Terminal	180-B-59	4	38-Y-1844
Trunks			
Local Ringdown	63-B-7	7/17/19	38-Y-1806
	75-B-8	7/25/19	"
Ringdown (Two-way)	139-B-8	5/8/13	38-Y-1806
	171-B-18	6	38-Y-1863, fig. 2, B
	175-B-48	7	" " " "
Miscellaneous			
	139-B-2	15	38-Y-1818, fig. 1

REPEATER EQUIPMENT

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
Telephone	171-B-21	9	38-Y-1907, fig. 1, A
	171-B-36	4	38-Y-1907, fig. 1, B
Trunks	171-B-35	7	38-Y-1807, fig. 1
	178-B-69	5	38-Y-1909, fig. 2

MORSE BOARD NO. 4

Type of Circuit	A. T. & T. CO.		Transmission
Operators' Telephone	Dwg. No.	Issue No.	Circuit Dwg. No.
	149-B-7	5	38-Y-1893, fig. 2 38-Y-1907, fig. 2, A

1941
1942
1943

1944
1945
1946

1947

1948
1949

1950
1951

1952
1953

1954
1955

1956
1957

1958

()

PRIVATE BRANCH EXCHANGE SWITCHBOARDS

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
	Long Extensions—All Types P. B. X.'s		
	168-B-5	16	38-Y-1853, A 38-Y-1875
		17	38-Y-1864, fig. 1, A & C
	179-B-51	2	38-Y-1853, A
	No. 1 Residence System		
	195-B-45	2	38-Y-1800, fig. 2
	P. B. X. No. 1		
Cords	164-B-6	4	38-Y-1878
	164-B-7	4	38-Y-1838, fig. 1
	164-B-8	8	38-Y-1864, fig. 2, B
	164-B-9	7	38-Y-1864, fig. 2, B 38-Y-1843, fig. 2
	171-B-34	2	38-Y-1833, fig. 2 38-Y-1838, fig. 1
Operators' Telephone	164-B-10	6	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A
	171-B-29	2	38-Y-1902 38-Y-1903, fig. 2
Trunks	164-B-11	5	38-Y-1844
	171-B-30	1	38-Y-1807, fig. 1
	P. B. X. No. 2		
	69-A-32	7/21/19	38-Y-1808, fig. 2 38-Y-1897, fig. 2 38-Y-1898, fig. 2
	93-B-5	8/29/19	38-Y-1808, fig. 2 38-Y-1897, fig. 2 38-Y-1896
	P. B. X. No. 3		
Cords	66-B-2	7/19/19	38-Y-1801, fig. 2
	66-B-15	7/21/19	38-Y-1821, fig. 1 38-Y-1881, fig. 2
Line Circuits Toll	66-B-16	7/21/19	38-Y-1804
Operators' Telephone	65-B-50	7/19/19	38-Y-1912, fig. 2
Trunks	66-B-11	7/21/19	38-Y-1804
	P. B. X. No. 4		
Cords	145-B-10	13	38-Y-1839, fig. 2
	164-B-16	11	" " "

P. B. X. Switchboards (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
P. B. X. No. 4 (Cont'd)			
Cords (Cont'd)	164-B-17	11	38-Y-1849 38-Y-1852, A 38-Y-1848
	164-B-18	7	38-Y-1843, fig. 2 38-Y-1848
	164-B-19	8	
Extensions (Long)	145-B-13	8/12/15	38-Y-1868, fig. 2, A & B
Line Circuits			
Toll	164-B-14	4	38-Y-1811, fig. 2
Operators' Telephone	145-B-7	8/3/11	38-Y-1899, fig. 1, A
	164-B-20	4	38-Y-1892, fig. 2, A 38-Y-1899, fig. 1, A
Trunks	145-B-11	4/30/14	38-Y-1820, fig. 2
	145-B-12	4/30/14	" " "
	164-B-21	6	" " "
P. B. X. No. 4—Multiple			
Cords	145-B-3	12/31/13	38-Y-1839, fig. 2
	164-B-26	7	38-Y-1848
	164-B-27	5	38-Y-1811, fig. 1
	171-B-5	5	38-Y-1839, fig. 2
	172-B-13	3	" " "
Line Circuits			
Toll	164-B-25	3	38-Y-1811, fig. 2
Operators' Telephone	145-B-1	10	38-Y-1899, fig. 1, A
	164-B-28	7	38-Y-1892, fig. 2, A 38-Y-1918, fig. 1, AC
Trunks	145-B-4	5/24/20	38-Y-1820, fig. 2
P. B. X.'s Nos. 505 A-B-C			
No. 505-A	124-A-2	5	38-Y-1838, fig. 1
			38-Y-1834, fig. 2
			38-Y-1897, fig. 1
No. 505-B	122-A-19	14	38-Y-1834, fig. 1
			38-Y-1835, fig. 1
			38-Y-1924, fig. 1
No. 505-C	141-A-27	5	38-Y-1834, fig. 1
			38-Y-1835, fig. 2
			38-Y-1924, fig. 1
P. B. X. No. 550-A			
Cords	166-B-6	6	38-Y-1837, fig. 1 38-Y-1840, fig. 1

P. B. X. Switchboards (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
P. B. X. No. 550-A (Cont'd)			
Cords (Cont'd)	166-B-7	6	38-Y-1837, fig. 1 38-Y-1837, fig. 2
Extensions (Long)	168-B-26	3	38-Y-1853, A 38-Y-1875
	168-B-27	3	38-Y-1877, fig. 2
Operators' Telephone	166-B-5	4	38-Y-1903, fig. 1
Trunks	172-B-23	2	38-Y-1852, B
P. B. X. No. 550-B			
Cords	174-B-26	6	38-Y-1837, fig. 1 38-Y-1837, fig. 2
	174-B-27	8	38-Y-1837, fig. 1 38-Y-1840, fig. 1
Extensions (Long)	174-B-23	3	38-Y-1853, A 38-Y-1875
	174-B-24	6	38-Y-1851, B
		7	38-Y-1864, fig. 2, A
	8	Made Provisional	
Operators' Telephone	174-B-28	4	38-Y-1899, fig. 1, A
Trunks	174-B-25	8	38-Y-1852, B
	176-B-44	3	38-Y-1860, fig. 1, A
	177-B-4	3	38-Y-1851, B 38-Y-1859
P. B. X. No. 550-C			
Cords	189-B-80	7	38-Y-1836, fig. 1 38-Y-1836, fig. 2 38-Y-1841, fig. 1
Operators' Telephone	189-B-81	9	38-Y-1899, fig. 2 38-Y-1905, fig. 2
P. B. X. No. 550-SC			
Cords	191-B-61	7	38-Y-1836, fig. 1 38-Y-1836, fig. 2 38-Y-1841, fig. 2
Operators' Telephone	191-B-62	6	38-Y-1899, fig. 2 38-Y-1905, fig. 1
P. B. X. No. 600—Multiple			
Cords	174-B-14	5	38-Y-1837, fig. 1 38-Y-1840, fig. 1
Operators' Telephone	174-B-15	3	38-Y-1902

P. B. X. Switchboards (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
	P. B. X. No. 600-C Multiple		
Cords	190-B-60	5	38-Y-1839, fig. 1 38-Y-1840, fig. 2
Extensions (Long)	188-B-70	8	38-Y-1864, fig. 1, B
	192-B-96	6	38-Y-1864, fig. 2, A 38-Y-1865, fig. 1, B
Operators' Telephone	190-B-59	7	38-Y-1910 38-Y-1914, fig. 2
Trunks	193-B-3	4	38-Y-1865, fig. 1, A
	193-B-34	5	38-Y-1864, fig. 1, B 38-Y-1864, fig. 2, A
	P. B. X. No. 601		
Cords			
Holding	163-B-28	8	38-Y-1806
Subscribers'	163-B-24	10	38-Y-1878
	163-B-25	7	"
	175-B-32	6	"
Toll	163-B-26	7	38-Y-1848
	163-B-27	7	38-Y-1843, fig. 2 38-Y-1848
	175-B-31	6	38-Y-1843, fig. 1 38-Y-1866, A
	175-B-33	6	38-Y-1848
	176-B-45	5	38-Y-1843, fig. 1 38-Y-1866, A
	Universal	135-A-50	4	38-Y-1843, fig. 1 38-Y-1849 38-Y-1866, A
Extensions (Long)	163-B-21	6	38-Y-1867, fig. 2, A, B, C 38-Y-1868, fig. 1, A, B, C
Line Circuits			
Toll	163-B-23	2	38-Y-1811, fig. 2
Operators' Telephone			
Subscribers'	163-B-29	4	38-Y-1907, fig. 1, A
Toll	163-B-30	7	38-Y-1892, fig. 2, A 38-Y-1918, fig. 1, AC
	175-B-35	3	38-Y-1892, fig. 2, A 38-Y-1918, fig. 1, AC
Trunks	163-B-34	8	38-Y-1860, fig. 1, B
	163-B-35	9	" " " " " "

P. B. X. Switchboards (Cont'd)

Type of Circuit	A. T. & T. CO.		Transmission Circuit Dwg. No.
	Dwg. No.	Issue No.	
P. B. X. No. 602			
Cords	154-B-3	7	38-Y-1839, fig. 2
Operators' Telephone	120-A-44	4	38-Y-1899, fig. 1, A
	154-B-4	3	38-Y-1895, fig. 1
Trunks	154-B-2	5	38-Y-1820, fig. 2
	193-B-73	1	" " "
P. B. X. No. 604			
Cords	179-B-37	5	38-Y-1843, fig. 1
			38-Y-1866, A
	179-B-40	5	38-Y-1878
	185-B-80	2	38-Y-1879
Line Circuits			
Toll	185-B-89	2	38-Y-1811, fig. 2
Operators' Telephone	179-B-36	2	38-Y-1907, fig. 1, A & B
	179-B-38	4	38-Y-1892, fig. 2, A
			38-Y-1918, fig. 1, AC, BC
Trunks	179-B-43	9	38-Y-1820, fig. 1
	179-B-99	6	" " "
	185-B-39	5	" " "
P. B. X. No. 650			
Operators' Telephone	154-B-7	6/14/13	38-Y-1895, fig. 1
Trunks			38-Y-1800, fig. 2
	130-A-12	9/8/13	38-Y-1838, fig. 1

**AVERAGE AND LIMITING LOSSES FOR
CIRCUITS AND EQUIPMENT**

TABLE II

**AVERAGE AND LIMITING LOSSES OF
TRANSMISSION CIRCUIT APPARATUS**

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
5800 S. UNIVERSITY AVENUE
CHICAGO, ILLINOIS 60637

RECEIVED
JAN 15 1964

UNIVERSITY MICROFILMS
SERIALS ACQUISITION
300 N. ZEEB RD.
ANN ARBOR, MICHIGAN 48106

UNIVERSITY MICROFILMS
SERIALS ACQUISITION
300 N. ZEEB RD.
ANN ARBOR, MICHIGAN 48106

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800 CYCLES
SERIES APPARATUS

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Condensers						
0.1mf .....	.5	1.3	4.3	1.0	2.5	6.5
1mf	0	0	.1	.5	.5	.5
2mf	0	0	0	.5	.5	.5
4mf	0	0	0	.5	.5	.5
Relays						
118A=AC=AN .....	.1	.1	.2	.5	.5	.5
B1=2 .....	.1	.1	.2	.5	.5	.5
B3 .....	.1	.1	.2	.5	.5	.5
B4 .....	.1	.1	.2	.5	.5	.5
B19—(10 Ohms)	0	0	.1	.5	.5	.5
(100 Ohms) .....	.2	.4	.8	.5	.5	1.0
B42—(14 Ohms)	0	.1	.1	.5	.5	.5
(50 Ohms) .....	.1	.2	.4	.5	.5	.5
B304 .....	.1	.1	.2	.5	.5	.5
Resistances						
1G (3000 Ohms)	4.5	6.7	10.9	5.0	7.0	11.5
1L (100 Ohms) .....	.2	.4	.8	.5	.5	1.0
1W (2000 Ohms)	3.2	4.9	8.5	3.5	5.5	9.0
18B (40 Ohms) .....	.1	.2	.3	.5	.5	.5
18G (200 Ohms) .....	.4	.7	1.4	.5	1.0	1.5
Signals						
32A .....	.8	.4	.8	.5	.5	1.0



800 CYCLES
SHUNT APPARATUS

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Buzzers						
4A						
4B						
Drops						
4D						
19A	1.5	.9	.5	2.0	1.5	1.0
22A .....	.9	.6	.2	1.5	1.0	.5
35A (Ser. aid.)	1.3	.8	.4	2.0	1.0	.5
(Each wdg.)	2.8	1.7	.9			
55A	1.5	.9	.5	2.0	1.5	1.0
55B	1.1	.8	.3	1.5	1.0	.5
55C	1.1	.8	.3	1.5	1.0	.5
56A	1.5	.9	.5	2.0	1.5	1.0
56B	1.1	.8	.3	1.5	1.0	.5
56L	1.1	.8	.3	1.5	1.0	.5
Impedance Coils						
17E=F (S. C.) .....	.1	0	0	.5	.5	.5
20A (S. C.) .....	.5	.3	.1	1.0	.5	.5
Relays						
25K						
44A=C=E=G=J .....	.8	.5	.2	1.5	1.0	.5
44N						
87A .....	.3	.2	.1	.5	.5	.5
89A=B .....	.9	.5	.2	1.5	1.0	.5
89C=E .....	.9	.6	.3	1.5	1.0	.5
89G .....	.9	.5	.2	1.5	1.0	.5
101H .....	.7	.4	.2	1.0	1.0	.5
105L						
108C						
114A .....	.6	.3	.2	1.0	.5	.5
114B	2.5	1.5	.8	3.0	2.0	1.0
114E (ser. aid.) .....	.6	.4	.2	1.0	.5	.5
(each wdg.)	1.3	.9	.4			
114G						
114J						
114M						
114Y						
114AG	5.3	3.4	1.6	7.0	4.5	3.0
114BK						
118J						
118K						
118N	1.1	.7	.3	2.0	1.0	.5
118AA .....	.2	.1	0	.5	.5	.5

Note: S. C. = Stromberg-Carlson.

800 Cycles—Shunt (Cont'd)

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Relays (Cont'd)						
118BF						
120A						
122J	1.0	.7	.3	1.5	1.0	.5
122L						
122CL .....	.6	.3	.1	1.0	.5	.5
124F						
124J						
168A						
172A .....	.6	.4	.2	1.0	.5	.5
177E .....	.5	.3	.1	1.0	.5	.5
178H	2.6	1.6	.8	3.0	2.0	1.0
186A .....	.6	.4	.2	1.0	1.0	.5
190E .....	.1	.1	0	.5	.5	.5
190F	5.2	3.2	1.5	6.0	4.0	2.0
196A=B	0	0	0	.5	.5	.5
203A						
206C						
366A (S. C.) .....	.9	.6	.3	1.5	1.0	.5
A27 .....	.4	.2	.1	.5	.5	.5
B11 .....	.1	0	0	.5	.5	.5
B13 .....	.6	.3	.1	1.0	.5	.5
B18						
B31 .....	.4	.2	.1	{ .5	{ .5	{ .5
B34 .....	.1	.1	0	{ .5	{ .5	{ .5
B40 (outer wdg.) .....	.8	.5	.3	1.0	1.0	.5
B43	3.5	2.2	.9	4.5	3.0	1.5
B57	5.8	3.8	1.9	7.5	5.0	2.5
B73 (ser. aid.)						
(each wdg.)						
B75 .....	.4	.2	.1	.5	.5	.5
B87	2.7	1.7	.8	3.5	2.5	1.0
B118 (2 wdgs. ser.)	1.1	.7	.4	1.5	1.0	.5
B128						
B256						
E34 .....	.7	.4	.2	1.0	1.0	.5
G3	1.0	.7	.3	1.5	1.0	.5
G5 .....	.7	.4	.2	1.5	1.0	.5
G7 (ser. aid.)						
(each wdg.)						
G9						
G12						
H10=11 .....	.4	.2	.2	.5	.5	.5
J1=3 .....	.1	.1	0	.5	.5	.5
Resistances						
1G (3000 Ohms)	2.7	1.7	.9	3.0	2.0	1.0
1L (100 Ohms)	21.7	17.4	12.0	22.5	18.0	12.5

Note: S. C. = Stromberg-Carlson.

800 Cycles—Shunt (Cont'd)

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Resistances (Cont'd)						
1W (2000 Ohms)	3.8	2.5	1.2	4.0	3.0	1.5
18B (40 Ohms)	29.1	24.7	18.6	30.0	25.5	19.0
18C (200 Ohms)	16.3	12.5	8.0	17.0	13.0	8.5
Retardation Coils						
1A						
1B	3.2	2.1	1.1	4.0	2.5	1.5
1C						
1F						
5C .....	.1	0	0	.5	.5	.5
5AA	0	0	0	.5	.5	.5
6B						
8B=C .....	.4	.2	.1	.5	.5	.5
8L .....	.1	.1	0	.5	.5	.5
8N .....	.4	.2	.1	.5	.5	.5
8P .....	.1	.1	0	.5	.5	.5
8U						
11B						
12A .....	.3	.2	.1	.5	.5	.5
12F .....	.4	.2	.1	.5	.5	.5
20A						
½-44B (ser. aid.)	0	0	0	.5	.5	.5
(par. aid.)	0	0	0	.5	.5	.5
½-44D	0	0	0	.5	.5	.5
½-44J						
46A .....	.9	.5	.2	1.5	1.0	.5
46B	2.7	1.7	.8	3.5	2.5	1.5
46E						
46F .....	.8	.5	.2	1.0	1.0	.5
46G .....	.9	.5	.2	1.5	1.0	.5
46K .....	.6	.3	.2	1.0	.5	.5
46S	7.7	5.2	2.7	9.0	6.0	3.5
46Y .....	.3	.2	.1	.5	.5	.5
47A .....	.9	.5	.2	1.5	1.0	.5
47B	2.7	1.7	.8	3.5	2.5	1.5
47E						
47F .....	.8	.5	.2	1.0	1.0	.5
47G .....	.9	.5	.2	1.5	1.0	.5
47H						
47K .....	.6	.3	.2	1.0	.5	.5
47S	7.7	5.2	2.7	9.0	6.0	3.5
47Y .....	.3	.2	.1	.5	.5	.5
53A						
54A (1-2-3-4-5-6)	0	0	0	.5	.5	.5
(1-2-5-6) .....	.3	.2	.1	.5	.5	.5
54B	0	0	0	.5	.5	.5
54C .....	.1	.1	0	.5	.5	.5
54D (ser. aid.) .....	.5	.3	.1	1.0	1.0	.5
(each wdg.)	1.7	.9	.3			

800 Cycles—Shunt (Cont'd)

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Retardation Coils (Cont'd)						
1/2-68C						
99A (ser. aid.)						
(par. aid.)						
Ringers						
2A						
6A .....	.3	.2	.1	.5	.5	.5
6B						
8A .....	.3	.2	.1	.5	.5	.5
8G						
38A .....	.3	.2	.1	.5	.5	.5
Signals						
39A (ser. aid.) .....	.7	.4	.2	1.0	1.0	.5
(each wdg.)	2.7	1.7	.9			
41B (ser. aid.)	1.6	1.0	.5	2.5	1.5	1.0
(each wdg.)	5.9	3.8	1.9			

800 CYCLES
TRANSFORMERS

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Autotransformers						
1-A (4-7:2-5)	1.1	1.1	1.2	1.5	1.5	1.5
(4-7 bridged) .....	.1	.1	0	.5	.5	.5
2-A (4-7:2-5) .....	.5	.7	.8	1.0	1.0	1.0
(4-7 bridged) .....	.1	.1	.1	.5	.5	.5
3-A (4-7:2-5) .....	.5	.7	.8	1.0	1.0	1.0
(4-7 bridged) .....	.1	.1	.1	.5	.5	.5
Induction Coils						
10 (L-L: F-F)						
(L-L bridged)						
20 (1-2: 3-4)			2.7			4.0
(1-2 bridged)	7.5	4.3	1.5			
23 (L ₁ -L ₂ : P _c -P _a)			5.9			7.0
(L ₁ -L ₂ bridged)	1.1	.6	.2			
24 (L-LT: P _c -P _a)			6.2			7.5
(L-LT bridged)	2.1	1.1	.5			
46 (1-2: 3-4)			2.7			4.0
(1-2 bridged)	5.4	2.7	.9			
62 (L-LT: P _c -P _a)						
(L-LT bridged)						
Repeating Coils						
11-A (1-4: 5-8) (S. C.)....	1.0	.7	.7			
(1-4 bridged) .....	.9	.5	.2	1.5	1.0	.5
12-A (2-5: 4-7)						
(2-5 bridged)						
12-B (2-5: 4-7)						
(2-5 bridged)						
20-A (1-2 bridged)	1.0	.5	.2	2.0	1.0	.5
" "	1.3	.7	.3			
20-E (1-2 bridged)	1.3	.7	.3	2.0	1.0	.5
" "	1.5	.9	.4			
20-G (1-2 bridged)	1.2	.6	.3	2.0	1.0	.5
20-H (1-2 bridged) .....	.9	.4	.2	1.5	1.0	.5
½-25A (2-5: 4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
½-25F (2-5: 4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
½-25G (2-5: 4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
½-25J (2-5: 4-7)	2.6	2.6	2.9	3.0	3.0	3.5
(2-5 bridged)	0	0	0			
½-25K (2-5: 4-7)						
(2-5 bridged)						
(4-7 bridged)						

Note: S. C. = Stromberg Carlson.

800 Cycles—Transformers (Cont'd)

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Repeating Coils (Cont'd)						
½-25M (2-5:4-7)	1.1	1.0	1.2	2.0	1.5	1.5
(2-5 bridged) .....	.1	0	0			
(4-7 bridged) .....	.5	.2	.1			
½-25N (2-5:4-7)	2.6	2.6	2.9	3.0	3.0	3.5
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.9	.4	.1			
½-25P (2-5:4-7)	2.6	2.6	2.9	3.0	3.0	3.5
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.9	.4	.1			
½-25R (2-5:4-7)	1.1	1.0	1.2	2.0	1.5	1.5
(2-5 bridged) .....	.1	0	0			
(4-7 bridged) .....	.5	.2	.1			
(1-6:7-8)						
½-25S (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
½-25T (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
25AC Front (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
25AC Rear (2-5:4-7)	2.6	2.6	2.9	3.0	3.0	3.5
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.9	.4	.1			
26A (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
26E (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
26F (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
26H (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
26J (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
26L (2-5:4-7)						
(2-5 bridged)						
(4-7 bridged)						
(1-6:7-8)						
26P (2-5:4-7)	2.6	2.6	2.9	3.0	3.0	3.5
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.9	.4	.1			
27A (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
27D (2-5:4-7) .....	.6	.5	.7	1.5	1.0	1.0
(2-5 bridged) .....	.3	.1	0	.5	.5	.5
27F (1-6:7-8)	9.0	9.0	9.5			
½-37A (2-5:4-7)						
37B (2-5:4-7)						
38A (2-5:4-7)						
38B (2-5:4-7)						

800 Cycles—Transformers (Cont'd)

	Average			Limiting		
	H 2200 Ohms	M 1300 Ohms	L 600 Ohms	H 2200 Ohms	M 1300 Ohms	L 600 Ohms
Repeating Coils (Cont'd)						
½-46A (2-5:4-7).....	.4	.4	.7	1.0	1.0	1.0
(2-5 bridged).....	.2	.1	0			
47A (2-5:4-7).....	.4	.4	.7	1.0	1.0	1.0
(2-5 bridged).....	.2	.1	0			
½-54A (10-1:5-6).....						
½-54B (2-5:4-7).....						
½-55A (2-5:4-7).....	.3	.4	.7	.5	1.0	1.0
½-55B (2-5:4-7).....	.5	.5	.8	1.0	1.0	1.0
½-55C (2-5:4-7).....	.5	.5	.8	1.0	1.0	1.0
½-55D (2-5:4-7).....	1.2	1.2	1.4	1.5	1.5	2.0
½-55E (2-5:4-7).....	1.2	1.2	1.4	1.5	1.5	2.0
½-75A (2-5:4-7).....	.3	.4	.7	.5	1.0	1.0
½-75B (2-5:4-7).....	.5	.5	.8	1.0	1.0	1.0
½-75C (2-5:4-7).....	.5	.5	.8	1.0	1.0	1.0
½-75D (2-5:4-7).....	1.2	1.2	1.4	1.5	1.5	2.0
½-75E (2-5:4-7).....	1.2	1.2	1.4	1.5	1.5	2.0
½-76A (2-5:4-7).....	.4	.4	.7	1.0	1.0	1.0
(2-5 bridged).....	.2	.1	0			
77A (2-5:4-7).....	.4	.4	.7	1.0	1.0	1.0
(2-5 bridged).....	.2	.1	0			

1000 CYCLES
SERIES APPARATUS

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Condensers						
0.1mf .....	.5	.9	2.9	.9	1.6	4.4
1mf	0	0	.1	.1	.1	.1
2mf	0	0	0	.1	.1	.1
4mf	0	0	0	.1	.1	.1
Relays						
118A=AC=AN .....	.1	.1	.2	.1	.2	.2
B1=2 .....	.1	.1	.2	.1	.1	.2
B3 .....	.1	.1	.2	.1	.2	.2
B4 .....	.1	.1	.2	.1	.1	.2
B19—(10 Ohms)	0	0	.1	.1	.1	.1
(100 Ohms) .....	.2	.4	.8	.2	.4	.8
B42—(14 Ohms)	0	.1	.1	.1	.1	.1
(50 Ohms) .....	.1	.2	.4	.1	.2	.4
B304 .....	.1	.1	.2	.1	.1	.2
Resistances						
1G (3000 Ohms)	5.2	7.0	10.9	5.4	7.2	11.2
1L (100 Ohms) .....	.2	.4	.8	.2	.4	.8
1W (2000 Ohms)	3.8	5.2	8.5	3.9	5.4	8.8
18B (40 Ohms) .....	.1	.2	.3	.1	.2	.3
18G (200 Ohms) .....	.5	.7	1.4	.5	.7	1.4
Signals						
32A .....	.2	.4	.8	.2	.4	.8

1941

1000 CYCLES
SHUNT APPARATUS

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Buzzers						
4A						
4B						
Drops						
4D						
19A	1.1	.8	.5	1.5	.9	.6
22A .....	.6	.5	.2	.9	.8	.4
35A (ser. aid.)	1.0	.7	.4	1.3	.9	.5
(each wdg.)	2.1	1.4	.8			
55A	1.1	.8	.5	1.5	.9	.6
55B .....	.9	.6	.3	1.1	.8	.4
55C .....	.9	.6	.3	1.1	.8	.4
56A	1.1	.8	.5	1.5	.9	.6
56B .....	.9	.6	.3	1.1	.8	.4
56L .....	.9	.6	.3	1.1	.8	.4
Impedance Coils						
17E=F (S. C.) .....	.1	0	0	.1	.1	.1
20A (S. C.) .....	.3	.2	.1	.5	.4	.2
Relays						
25K						
44N=C=E=G=J .....	.6	.4	.2	.9	.6	.3
44N						
87A .....	.2	.2	.1	.3	.3	.1
89A=B .....	.6	.4	.2	.9	.6	.3
89C=E .....	.7	.4	.2	.9	.6	.3
89G .....	.6	.4	.2	.9	.6	.3
101H .....	.5	.3	.2	.6	.4	.2
105L						
108C						
114A .....	.4	.3	.1	.6	.4	.2
114B	1.8	1.1	.7	2.4	1.5	.8
114E (ser. aid.) .....	.5	.3	.1	.6	.4	.2
(each wdg.) .....	.9	.7	.4			
114G						
114J						
114M						
114Y						
114AG	4.1	2.7	1.3	5.0	3.6	1.9
114BK						
118J						
118K						
118N .....	.9	.6	.3	1.2	.8	.4
118AA .....	.2	.1	0	.2	.1	.1

Note: S. C. = Stromberg-Carlson.

1000 Cycles—Shunt (Cont'd)

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Relays (Cont'd)						
118BF						
120A						
122J .....	.8	.6	.3	1.0	.8	.4
122L						
122CL .....	.5	.3	.1	.7	.4	.2
124F						
124J						
168A						
172A .....	.5	.3	.1	.6	.4	.2
177E .....	.4	.3	.1	.6	.4	.2
178H	1.9	1.3	.7	2.5	1.6	.9
186A .....	.5	.3	.2	.6	.4	.3
190E .....	.1	.1	0	.2	.1	.1
190F	3.9	2.7	1.4	4.4	2.9	1.7
196A=B	0	0	0	.1	.1	.1
203A						
206C						
366A (S. C.) .....	.7	.5	.3	.9	.7	.4
A27 .....	.3	.2	.1	.4	.3	.1
B11 .....	.1	0	0	.2	.1	.1
B13 .....	.5	.3	.1	.7	.4	.2
B18						
B31 .....	.3	.2	.1	.4	.3	.1
B34 .....	.1	0	0	.1	.1	.1
B40 (outer wdg.) .....	.6	.4	.2	.8	.5	.2
B43	2.7	1.8	.9	3.1	2.2	1.1
B57	4.5	3.2	1.7	5.6	4.0	2.3
B73 (ser. aid.) (each wdg.)						
B75 .....	.3	.2	.1	.4	.3	.1
B87	2.1	1.3	.7	2.8	1.8	.9
B118 (2 wdgs. ser.) .....	.9	.7	.4	1.0	.7	.4
B128						
B256						
E34 .....	.6	.4	.2	.8	.5	.2
G3 .....	.7	.5	.2	1.0	.8	.4
G5 .....	.5	.3	.2	.9	.5	.3
G7 (ser. aid.) (each wdg.)						
G9						
G12						
H10=11 .....	.3	.2	.2	.4	.3	.2
J1=3 .....	.1	.1	0	.1	.1	.1
Resistances						
1G (3000 Ohms)	2.3	1.6	.9	2.4	1.7	.9
1L (100 Ohms)	19.9	16.9	12.0	20.3	17.4	12.3

Note: S. C. = Stromberg-Carlson.

1000 Cycles—Shunt (Cont'd)

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Resistances (Cont'd)						
1W (2000 Ohms)	3.2	2.3	1.2	3.3	2.4	1.3
18B (40 Ohms)	27.4	24.2	18.6	28.0	24.6	18.9
18C (200 Ohms)	14.9	12.0	8.0	15.2	12.4	8.2
Retardation Coils						
1A						
1B	2.5	1.7	1.0	3.1	2.1	1.2
1C						
1F						
5C	0	0	0	.1	.1	.1
5AA	0	0	0	.1	.1	.1
6B						
8B=C .....	.3	.2	.1	.4	.3	.1
8L .....	.1	.1	0	.2	.1	.1
8N .....	.3	.2	.1	.4	.3	.1
8P .....	.1	.1	0	.2	.1	.1
8U						
11B						
12A .....	.2	.1	.1	.4	.2	.2
12F .....	.2	.2	.1	.4	.3	.2
20A						
½-44B (ser. aid.)	0	0	0	.1	.1	.1
(par. aid.)	0	0	0	.1	.1	.1
½-44D	0	0	0	.1	.1	.1
½-44J						
46A .....	.7	.4	.2	1.0	.7	.3
46B	1.9	1.3	.7	2.5	1.7	1.0
46E						
46F .....	.7	.4	.2	.9	.5	.3
46G .....	.7	.4	.2	.9	.5	.3
46K .....	.5	.3	.1	.8	.5	.2
46S	6.1	4.4	2.5	6.8	4.9	2.8
46Y .....	.2	.1	.1	.3	.2	.1
47A .....	.7	.4	.2	1.0	.7	.3
47B	1.9	1.3	.7	2.5	1.7	1.0
47E						
47F .....	.7	.4	.2	.9	.5	.3
47G .....	.7	.4	.2	.9	.5	.3
47H						
47K .....	.5	.3	.1	.8	.5	.2
47S	6.1	4.4	2.5	6.8	4.9	2.8
47Y .....	.2	.1	.1	.3	.2	.1
53A						
54A (1-2-3-4-5-6)	0	0	0	.1	.1	.1
(1-2-5-6) .....	.2	.1	.1	.3	.2	.1
54B	0	0	0	.1	.1	.1
54C .....	.1	0	0	.2	.1	.1

1000 Cycles—Shunt (Cont'd)

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Retardation Coils (Cont'd)						
54D (ser. aid.) .....	.3	.2	.1	.7	.5	.2
(each wdg.)	1.0	.6	.3			
½-68C						
99A (ser. aid.)						
(par. aid.)						
Ringers						
2A						
6A .....	.2	.2	.1	.4	.2	.1
6B						
8A .....	.2	.2	.1	.4	.2	.1
8G						
38A .....	.3	.2	.1	.4	.2	.1
Signals						
39A (ser. aid.) .....	.6	.4	.2	.9	.6	.3
(each wdg.)	2.0	1.4	.8			
41B (ser. aid.)	1.1	.8	.4	1.6	1.1	.6
(each wdg.)	4.4	3.2	1.7			

1000 CYCLES
TRANSFORMERS

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Autotransformers						
1-A (4-7:2-5)	1.1	1.1	1.2	1.3	1.3	1.2
(4-7 bridged) .....	.1	.1	.1	.1	.1	.1
2-A (4-7:2-5) .....	.5	.7	.8	.7	.8	.8
(4-7 bridged) .....	.1	.1	.1	.1	.1	.1
3-A (4-7:2-5) .....	.5	.7	.8	.7	.8	.8
(4-7 bridged) .....	.1	.1	.1	.1	.1	.1
Induction Coils						
10 (L-L ₁ :P-P)						
(L-L bridged)						
20 (1-2:3-4)			2.1			3.0
(1-2 bridged)	4.8	2.9	1.0			
23 (L ₁ -L ₂ :P _c -P _a)			5.8			6.5
(L ₁ -L ₂ bridged) .....	.6	.3	.2			
24 (L-LT:P _c -P _a)			5.8			6.6
(L-LT bridged)	1.2	.8	.3			
46 (1-2:3-4)			2.3			3.3
(1-2 bridged)	3.1	1.8	.7			
62 (L-LT:P _c -P _a)						
(L-LT bridged)						
Repeating Coils						
11-A (1-4:5-8) (S. C.)....	.7	.6	.6			
(1-4 bridged) .....	.6	.3	.1	.9	.5	.2
12-A (2-5:4-7)						
(2-5 bridged)						
12-B (2-5:4-7)						
(2-5 bridged)						
20-A (1-2 bridged) .....	.6	.3	.2	1.0	.5	.3
(1-3 bridged) .....	.8	.5	.3			
20-E (1-2 bridged) .....	.8	.5	.3	1.2	.7	.4
(1-3 bridged) .....	.9	.6	.3			
20-G (1-2 bridged) .....	.7	.4	.2	.9	.6	.3
20-H (1-2 bridged) .....	.5	.3	.2	.7	.5	.3
½-25A (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
½-25F (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
½-25G (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
½-25J (2-5:4-7)	2.6	2.6	2.9	2.8	2.7	3.2
(2-5 bridged)	0	0	0			
½-25K (2-5:4-7)						
(2-5 bridged)						
(4-7 bridged)						

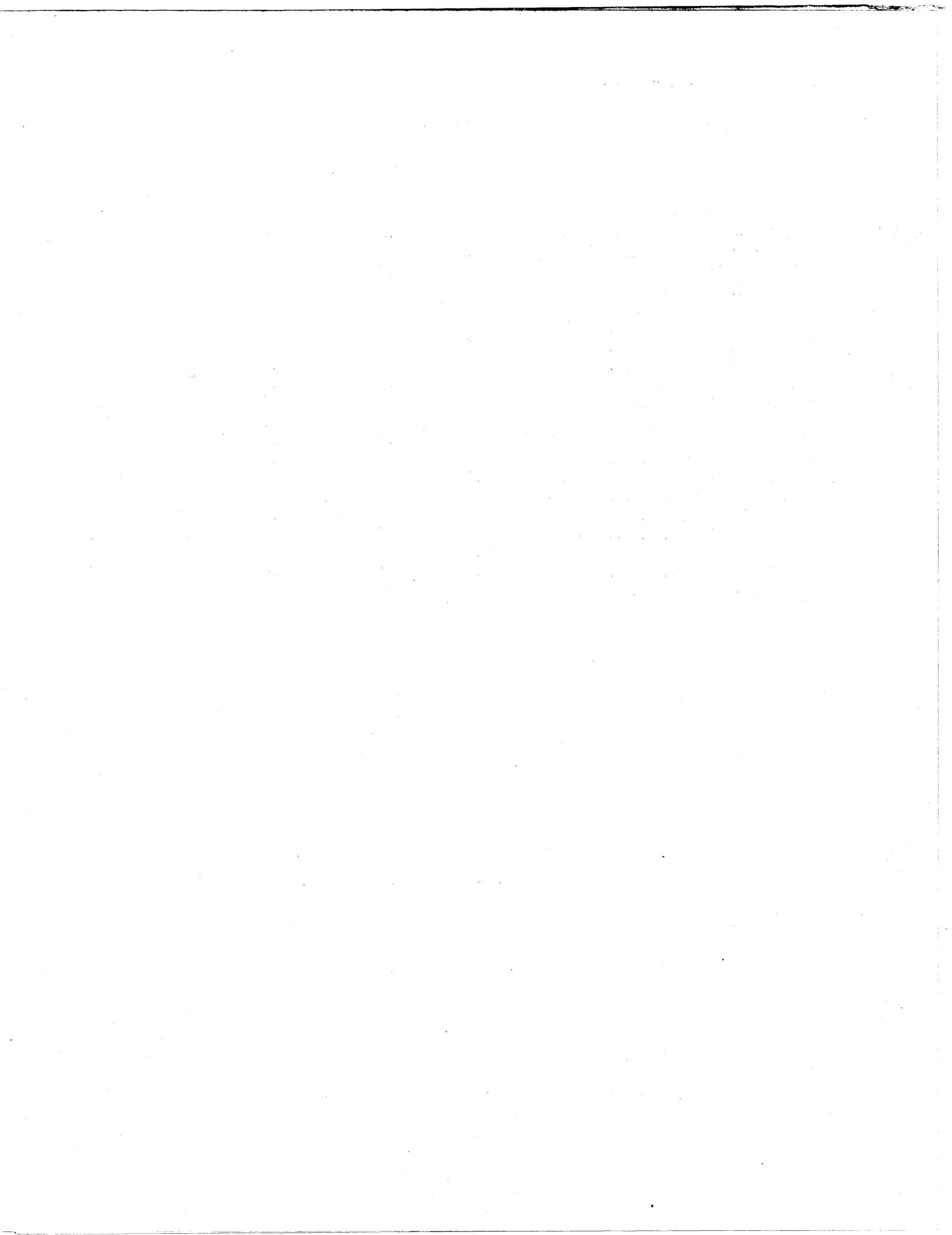
Note: S. C. = Stromberg-Carlson.

1000 Cycles—Transformers (Cont'd)

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Repeating Coils (Cont'd)						
1/2-25M (2-5:4-7)	1.0	1.0	1.2	1.3	1.3	1.5
(2-5 bridged) .....	.1	0	0			
(4-7 bridged) .....	.3	.2	.1			
1/2-25N (2-5:4-7)	2.6	2.6	2.9	2.8	2.7	3.2
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.5	.3	.1			
1/2-25P (2-5:4-7)	2.6	2.6	2.9	2.8	2.7	3.2
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.5	.3	.1			
1/2-25R (2-5:4-7)	1.0	1.0	1.2	1.3	1.3	1.5
(2-5 bridged) .....	.1	0	0			
(4-7 bridged) .....	.3	.2	.1			
(1-6:7-8)						
1/2-25S (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
1/2-25T (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
25AC, Front (2-5:4-7) ....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
25AC, Rear (2-5:4-7)	2.6	2.6	2.9	2.8	2.7	3.2
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.5	.3	.1			
26A (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
26E (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
26F (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
26H (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
26J (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
26L (2-5:4-7)						
(2-5 bridged)						
(4-7 bridged)						
(1-6:7-8)						
26P (2-5:4-7)	2.6	2.6	2.9	2.8	2.7	3.2
(2-5 bridged)	0	0	0			
(4-7 bridged) .....	.5	.3	.1			
27A (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
27D (2-5:4-7) .....	.4	.4	.7	.9	.9	.9
(2-5 bridged) .....	.2	.1	0	.4	.2	.1
27F (1-6:7-8)	6.9	9.1	9.6			
1/2-37A (2-5:4-7)						
37B (2-5:4-7)						
38A (2-5:4-7)						
38B (2-5:4-7)						

1000 Cycles—Transformers (Cont'd)

	Average			Limiting		
	H 1800 Ohms	M 1200 Ohms	L 600 Ohms	H 1800 Ohms	M 1200 Ohms	L 600 Ohms
Repeating Coils (Cont'd)						
½-46A (2-5:4-7).....	.4	.4	.7	.6	.6	.9
(2-5 bridged).....	.1	.1	0			
47A (2-5:4-7).....	.4	.4	.7	.6	.6	.9
(2-5 bridged).....	.1	.1	0			
54A (10-1:5-6).....						
½-54B (2-5:4-7).....						
½-55A (2-5:4-7).....	.3	.4	.8	.6	.6	.9
½-55B (2-5:4-7).....	.5	.5	.8	.7	.7	.9
½-55C (2-5:4-7).....	.5	.5	.8	.7	.7	.9
½-55D (2-5:4-7).....	1.2	1.2	1.5	1.4	1.4	1.7
½-55E (2-5:4-7).....	1.2	1.2	1.5	1.4	1.4	1.7
½-75A (2-5:4-7).....	.3	.4	.8	.6	.6	.9
½-75B (2-5:4-7).....	.5	.5	.8	.7	.7	.9
½-75C (2-5:4-7).....	.5	.5	.8	.7	.7	.9
½-75D (2-5:4-7).....	1.2	1.2	1.5	1.4	1.4	1.7
½-75E (2-5:4-7).....	1.2	1.2	1.5	1.4	1.4	1.7
½-76A (2-5:4-7).....	.4	.4	.7	.6	.6	.9
(2-5 bridged).....	.1	.1	0			
77A (2-5:4-7).....	.4	.4	.7	.6	.6	.9
(2-5 bridged).....	.1	.1	0			



TRANSMISSION EQUIVALENTS FOR TRUNKS

(In Terms of Transmission Units)

Measuring Current Frequency 800 Cycles

Loading	Gauge (B.&S.) and Type of Conductors									
	24		22				19		16	13
	SM	NM	NA or ANA	SA or ASA	TA	TS	ANB or TB	BNB	TH	TJ
H-175-N	—	—	—	—	—	—	.28	.32	.16	.10
H-250-N	—	—	—	—	—	—	.25	—	.15	.10
M-135-N	1.1	1.04	.71	.76	—	—	.36	.41	—	—
M-175-N	—	.94	.64	.69	.59	.62	.32	.37	.17	.10
R-133-N	—	—	.80	—	.73	.77	.40	—	.21	.12
Non-Loaded	1.96	1.83	1.52	1.62	1.40	1.46	1.01	1.14	.68	.46

Measuring Current Frequency 1000 Cycles

Loading	Gauge (B.&S.) and Type of Conductors									
	24		22				19		16	13
	SM	NM	NA or ANA	SA or ASA	TA	TS	ANB or TB	BNB	TH	TJ
H-175-N	—	—	—	—	—	—	.29	.32	.16	.11
H-250-N	—	—	—	—	—	—	.26	—	.16	.11
M-135-N	1.20	1.09	.73	.78	—	—	.36	.41	—	—
M-175-N	—	.97	.65	.70	.60	.63	.33	.37	.18	.11
R-133-N	—	—	.83	—	.76	.80	.41	—	.21	.12
Non-Loaded	2.19	2.04	1.70	1.81	1.55	1.63	1.12	1.27	.75	.50

TRANSMISSION EQUIVALENTS FOR TOLL, ENTRANCE AND INTERMEDIATE CABLE AND OPEN WIRE.

(In Terms of Transmission Units.)

Measuring Current Frequency 1000 Cycles

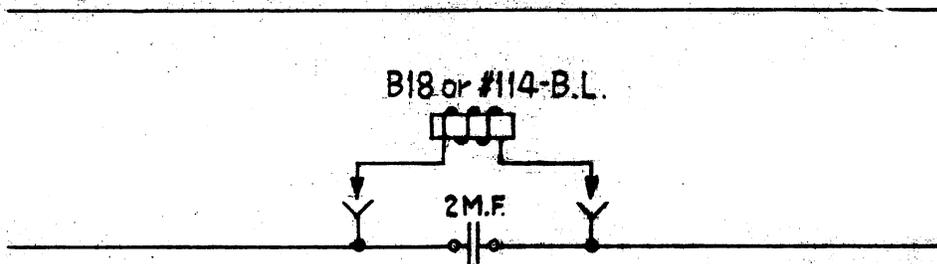
Cable	Loading	Gauge (B.&S.) of Conductors				
		19	16	14	13	10
Toll	H-44-25-P	.40	.21	—	—	—
	H-44-25-S	.48	.25	—	—	—
	H-174-63-P	.28	.16	—	—	—
	H-174-63-S	.28	.16	—	—	—
	H-174-106-P	.22	.13	—	.086	—
	H-174-106-S	.28	.16	—	.104	—
	H-245-155-P	.21	.12	—	.085	.064
	H-245-155-S	.26	.16	—	.107	.081
	H-245-N	—	—	.10	—	—
	M-174-106-P	.26	.15	—	.089	.058
	M-174-106-S	.33	.18	—	.109	.072
	K-200-130-P	—	.12	—	.070	.047
	K-200-130-S	—	.15	—	.090	.059
	K-200-N	—	.14	—	.082	—
Entrance and Intermediate	C-4.1-S	.66	.38	—	.222	.152
	C-4.8-S	.64	.38	—	.240	.160
	CE-4.1-12.8-P	.52	.30	—	.190	.130
	CE-4.8-12.8-P	.53	.31	—	.20	.140
	E-248-154-P	.19	.11	—	.070	.051
	E-248-154-S	.23	.13	—	.081	.057
	E-28-16-P	.47	.24	—	.130	.070
	E-28-16-S	.56	.29	—	.154	.083
	M-44-25-P	.48	.24	—	.130	.070
	M-44-25-S	.57	.29	—	.152	.081
	Non-Loaded - P	.96	.64	—	.414	.241
	Non-Loaded - S	1.09	.73	—	.487	.296

Open Wire

Loading	Diameter (ins.) of Conductors		
	.080	.104	.165
W-240-150-P	—	.025	.014
W-240-150-S	—	.028	.016
Non-Loaded - P	.090	.057	.025
Non-Loaded - S	.106	.068	.031

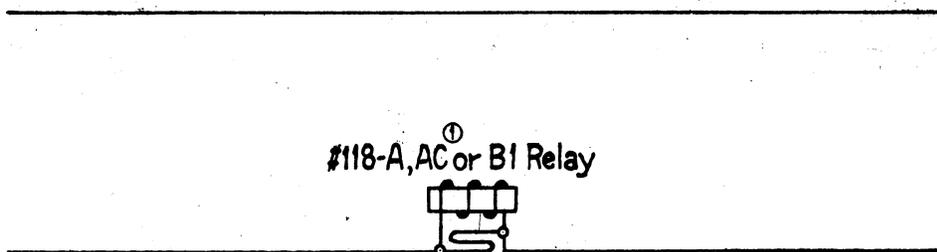
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

FIG. 2

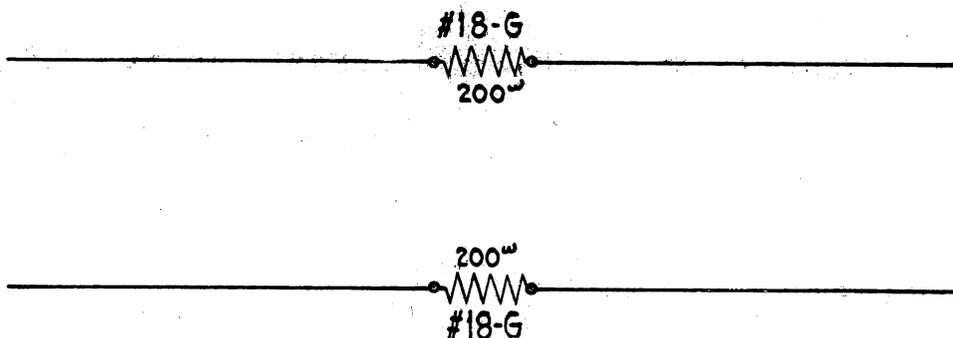


Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
B1	Ave.	.1	.1	.2	.1	.1	.2
	Lim.			.5			.3
#118-A	Ave.	.1	.1	.2	.1	.1	.2
	Lim.			.5			.3

① #118-A = #118-AC.

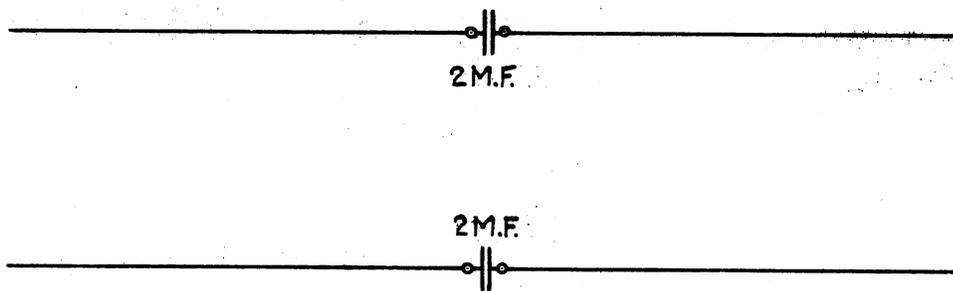
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
Ave.	.8	1.2	2.5	.9	1.3	2.5	
Lim.			3.0			2.6	

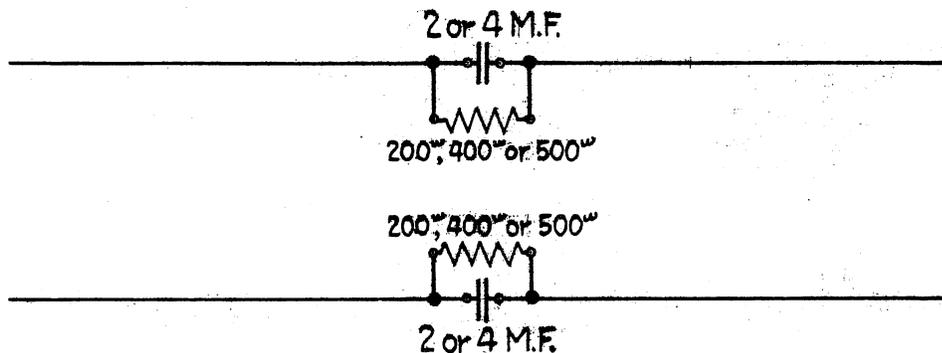
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
Ave.	0	0	.1	0	0	.1	
Lim.			.5			.2	

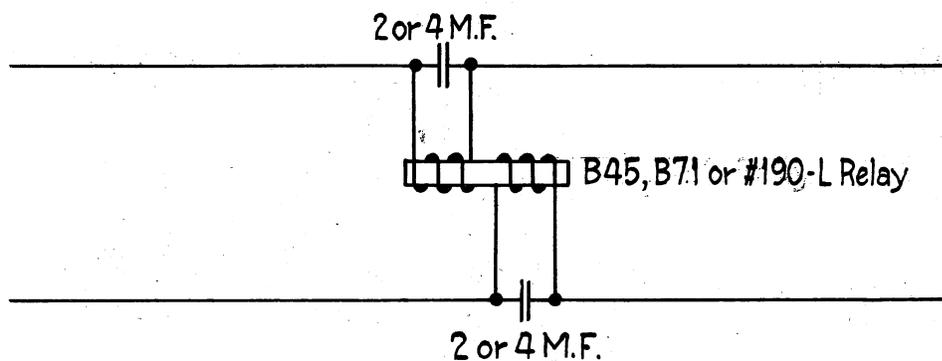
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Conditions		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
2 M.F. 200 ω	Ave.	.2	.3	.6	.1	.2	.4
	Lim.			1.0			.5
4 M.F. 400 ω or 500 ω	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

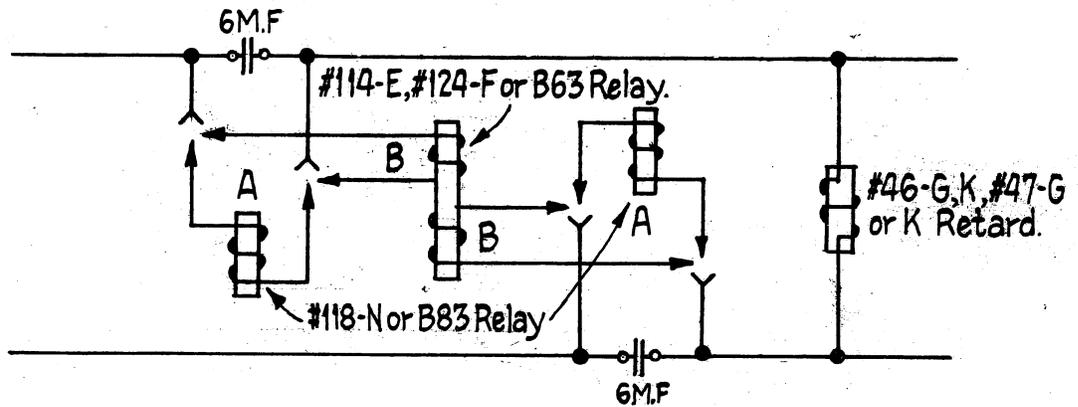
FIG. 2



Conditions		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
2 M.F.	Ave.	0	0	.1	0	0	.1
	Lim.			.5			.2
4 M.F.	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

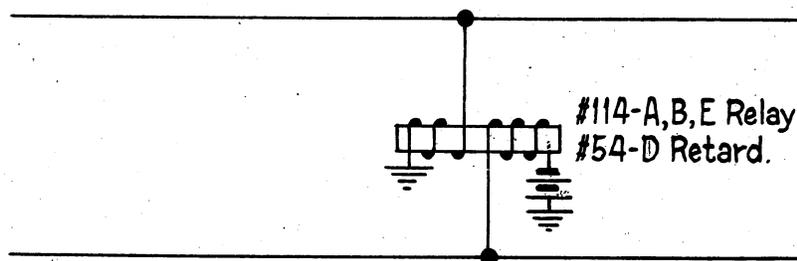
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



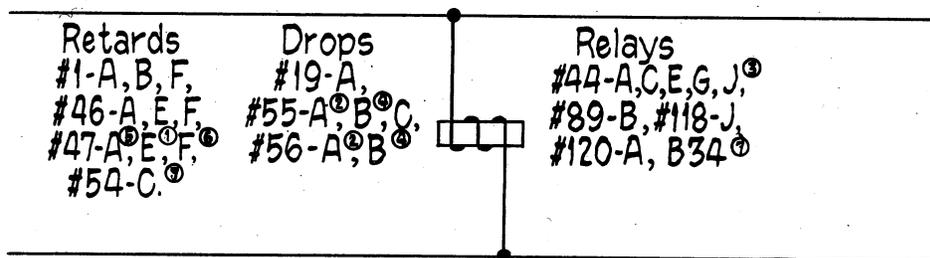
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

FIG. 2



Relay or Retard.		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#114-A	Ave.	.6	.3	.2	.4	.3	.1
	Lim.			.5			.2
#114-B	Ave.	2.5	1.5	.8	1.8	1.1	.7
	Lim.			1.0			.8
#114-E	Ave.	.6	.4	.2	.5	.3	.1
	Lim.			.5			.2
#54-D	Ave.	.5	.3	.1	.3	.2	.1
	Lim.			.5			.2

TRANSMISSION CIRCUITS AND LOSSES



Drop, Relay or Retard		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#19-A	Ave.	1.5	.9	.5	1.1	.8	.5
	Lim.			1.0			.6
#55-C	Ave.	1.1	.8	.3	.9	.6	.3
	Lim.			.5			.4
#44-A	Ave.	.8	.5	.2	.6	.4	.2
	Lim.			.5			.3
#89-B	Ave.	.9	.5	.2	.6	.4	.2
	Lim.			.5			.3
#118-J	Ave.						
	Lim.						
#120-A	Ave.						
	Lim.						
B34	Ave.	.1	.1	.0	.1	0	0
	Lim.			.5			.1
#1-A	Ave.						
	Lim.						
#1-B	Ave.						
	Lim.						
#1-F	Ave.						
	Lim.						
#46-A	Ave.	.9	.5	.2	.7	.4	.2
	Lim.			.5			.3
#46-E	Ave.						
	Lim.						
#46-F	Ave.	.8	.5	.2	.7	.4	.2
	Lim.			.5			.3

① #47-E = #46-E

② #55-A = #56-A = #19-A

③ #44-A = C = E = G = J

④ #55-B = #55-C = #56-B

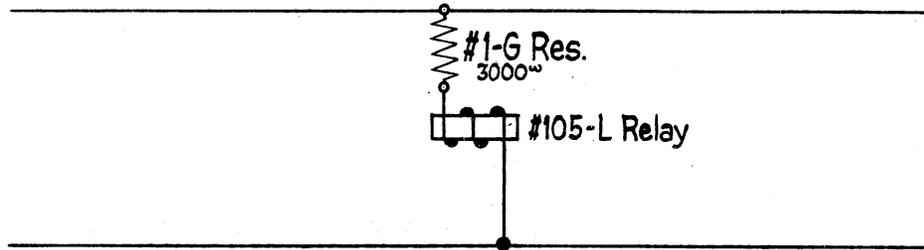
⑤ #46-A = #47-A

⑥ #46-F = #47-F

⑦ #54-C Retard causes the same loss in this circuit as the B34 Relay.

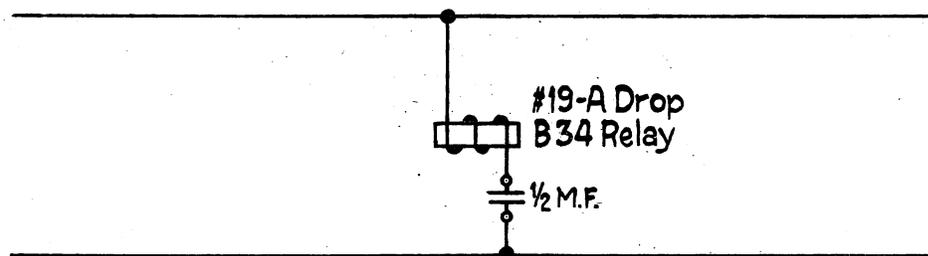
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



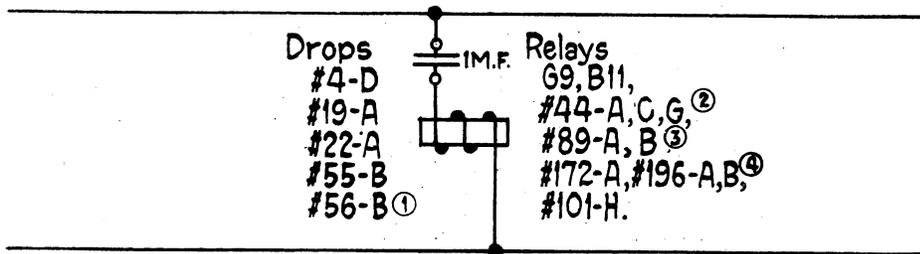
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

FIG. 2



Drop or Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#19-A	Ave.	1.6	1.0	.5	1.2	.9	.5
	Lim.			1.0			.6
B34	Ave.	.1	.1	.1	.1	.1	.1
	Lim.			.5			.2

TRANSMISSION CIRCUITS AND LOSSES

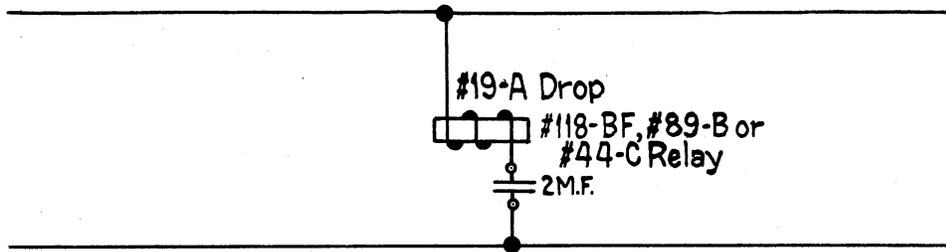


Drop or Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#4-D	Ave.						
	Lim.						
#19-A	Ave.	1.5	.9	.5	1.1	.8	.5
	Lim.			1.0			.6
#22-A	Ave.	.9	.6	.2	.6	.5	.2
	Lim.			.5			.4
#55-B	Ave.	1.1	.8	.3	.9	.6	.3
	Lim.			.5			.4
#44-A	Ave.	.8	.5	.2	.6	.4	.2
	Lim.			.5			.3
#89-A	Ave.	.9	.6	.3	.7	.5	.3
	Lim.			.5			.4
#172-A	Ave.	.6	.4	.2	.5	.3	.1
	Lim.			.5			.2
#196-A	Ave.	0	0	0	0	0	0
	Lim.			.5			.1
B11	Ave.	.1	0	0	.1	0	0
	Lim.			.5			.1
G9	Ave.						
	Lim.						
#101-H	Ave.	.7	.4	.2	.5	.3	.2
	Lim.			.5			.3

- ① #55-B=#56-B Drop
- ② #44-A=#44-C=#44-G Relay
- ③ #89-A=#89-B Relay
- ④ #196-A=#196-B "

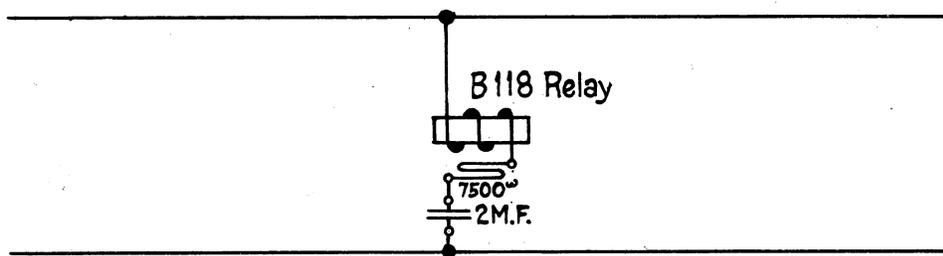
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Drop or Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#19-A	Ave.	1.5	.9	.5	1.1	.8	.5
	Lim.			1.0			.6
#44-C	Ave.	.8	.5	.2	.6	.4	.2
	Lim.			.5			.3
#89-B	Ave.	.9	.6	.3	.7	.5	.3
	Lim.			.5			.4
#118-BF	Ave.						
	Lim.						

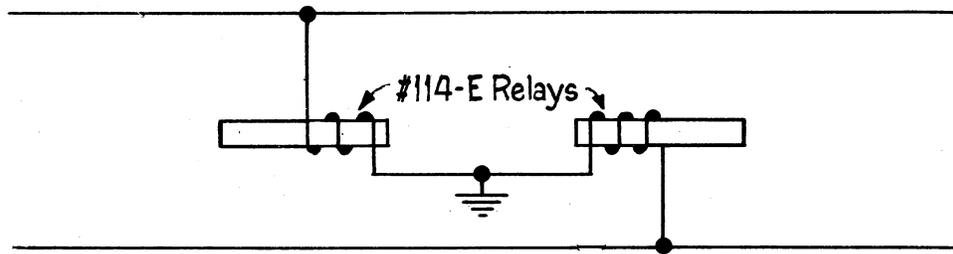
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.1	.7	.4	.9	.7	.4
	Lim.			.5			.5

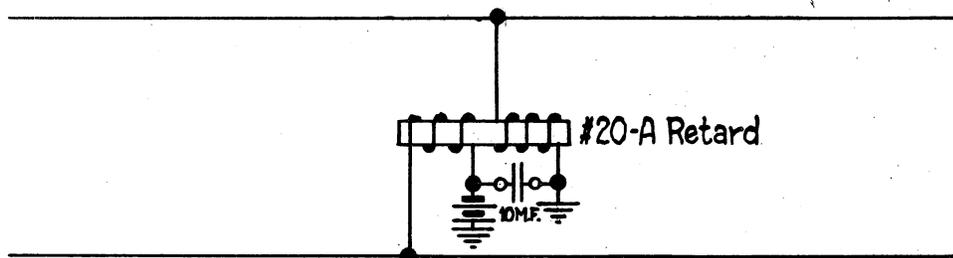
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave	.7	.5	.3	.6	.4	.2
	Lim			.5			.3

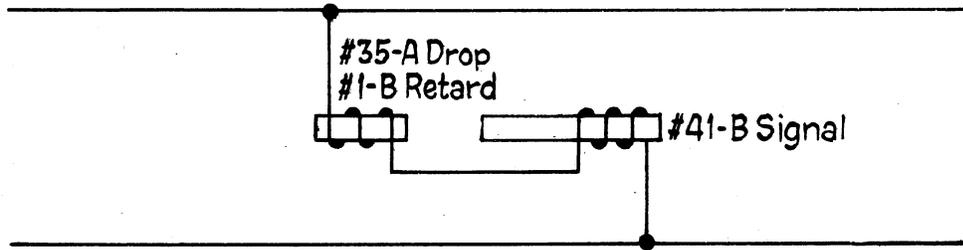
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

TRANSMISSION CIRCUITS AND LOSSES

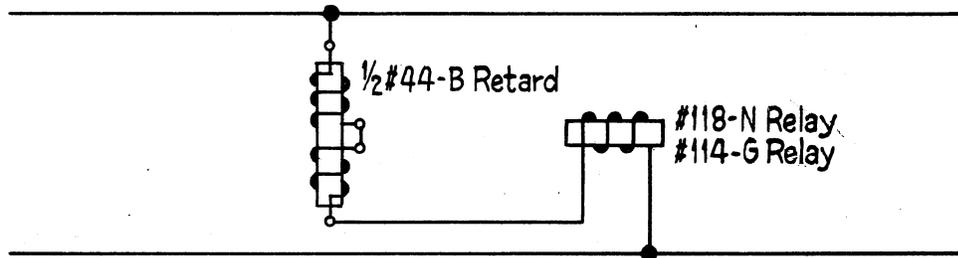
FIG. 1



Drop or Retard		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#35-A	Ave.	2.1	1.3	.7	1.5	1.0	.6
	Lim.			1.0			.8
#1-B *	Ave.	2.3	1.4	.7	1.7	1.2	.7
	Lim.			1.0			.9

* Estimated Loss

FIG. 2

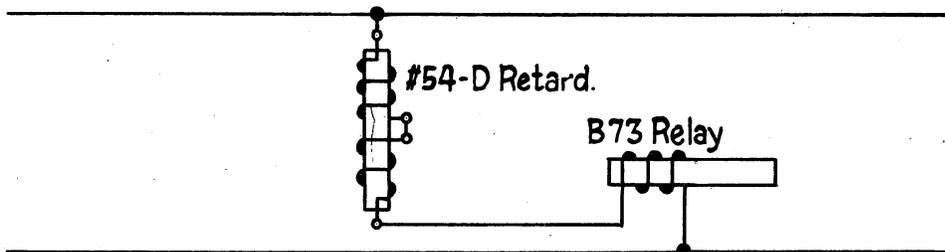


Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#118-N	Ave.	0	0	0	0	0	0
	Lim.			.5			.1
#114-G	Ave.						
	Lim.						

TRANSMISSION CIRCUITS AND LOSSES

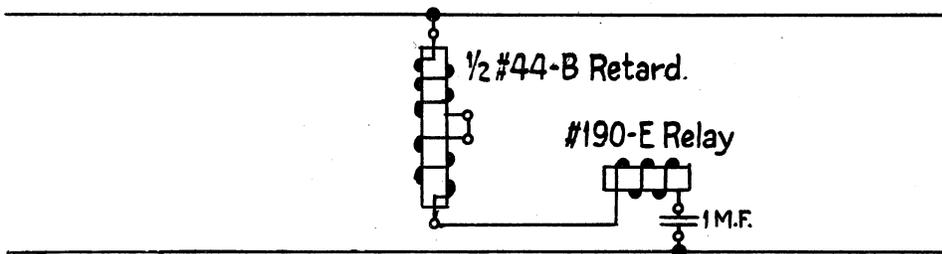
38-Y-1810

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

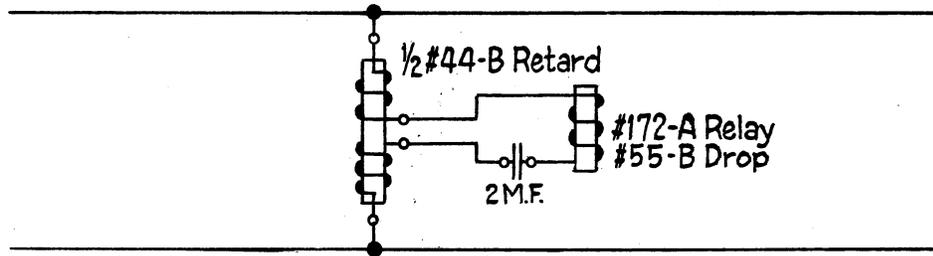
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

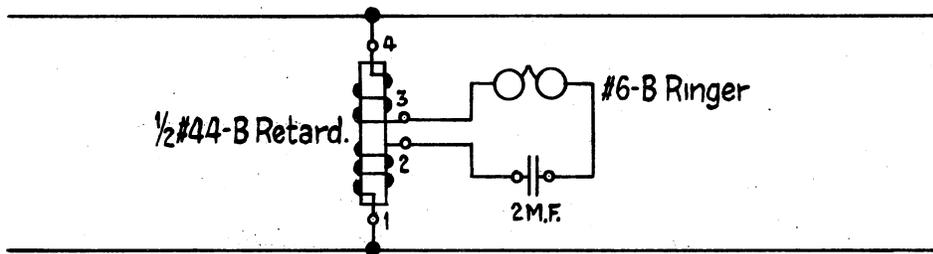
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

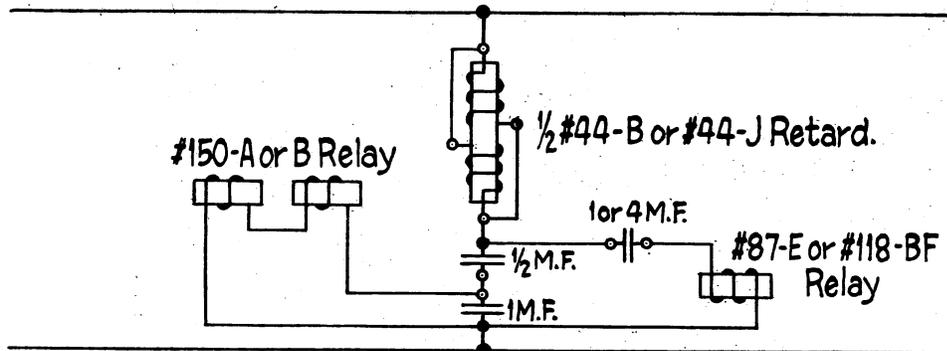
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

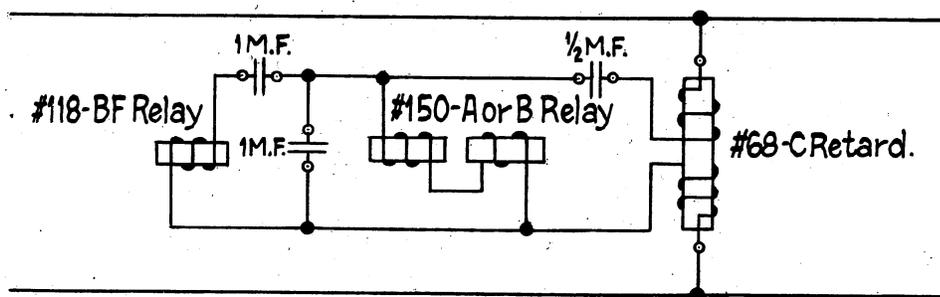
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Retard		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
#44-B	Ave.	0	0	0	0	0	0
	Lim.			.5			.1
#44-J	Ave.						
	Lim.						

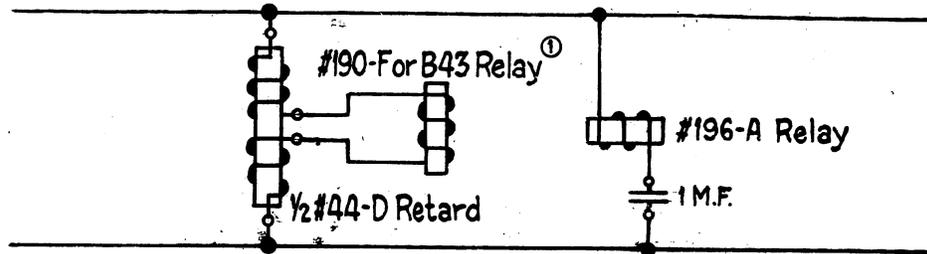
FIG. 2



		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
	Ave.						
	Lim.						

TRANSMISSION CIRCUITS AND LOSSES

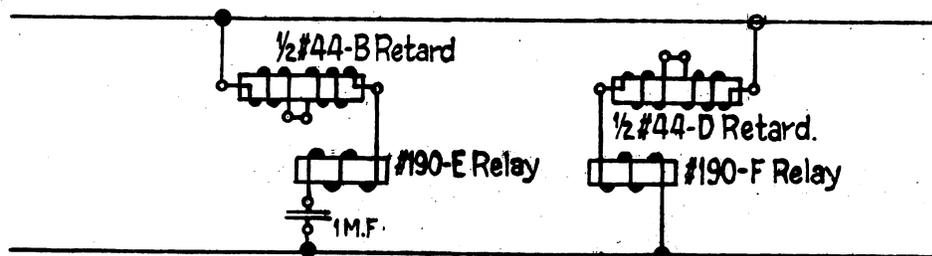
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

① #190-F or B43 relays in this circuit cause the same loss.

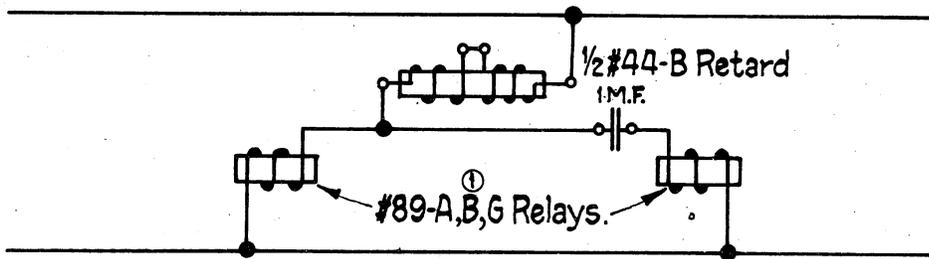
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

TRANSMISSION CIRCUITS AND LOSSES

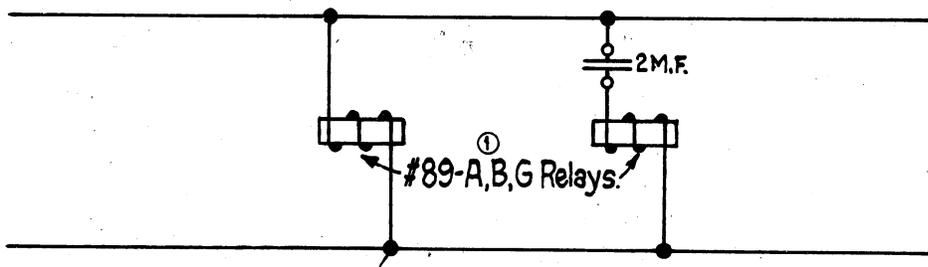
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

① #89-A=#89-B=#89-G

FIG. 2

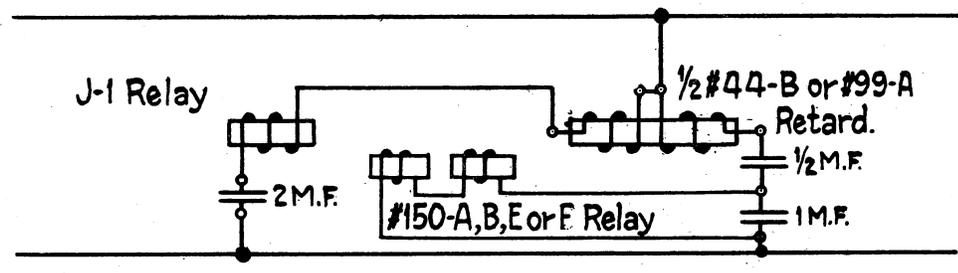


		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.8	1.0	.5	1.2	.9	.5
	Lim.			1.0			.7

① #89-A=#89-B=#89-G.

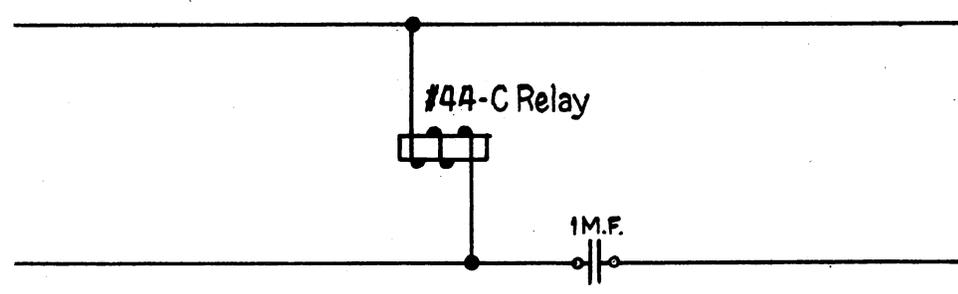
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Conditions		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
1/2 #44-B and #150-B or E	Ave.						
	Lim.						
#99-A and #150-A or F	Ave.						
	Lim.						

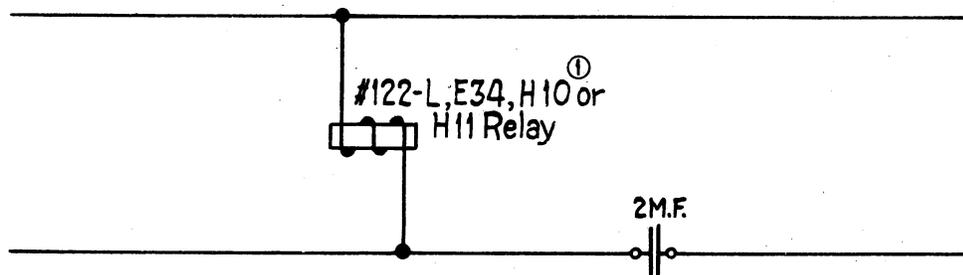
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.9	.5	.3	.7	.5	.3
	Lim.			.5			.4

TRANSMISSION CIRCUITS AND LOSSES

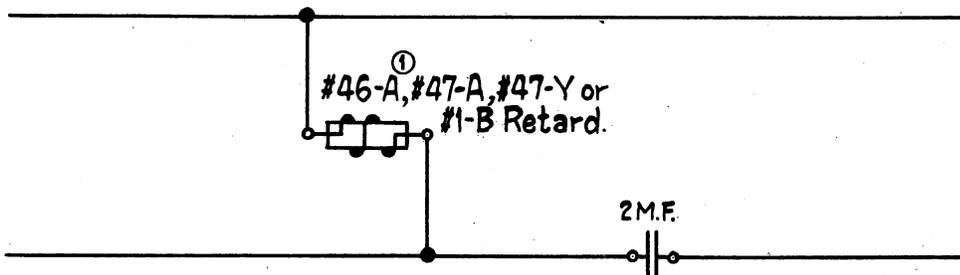
FIG. 1



Relays		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#122-L	Ave.						
	Lim.						
E34	Ave.	.7	.4	.2	.6	.4	.2
	Lim.			.5			.3
H10	Ave.	.4	.2	.2	.3	.2	.2
	Lim.			.5			.3

① H10 = H11

FIG. 2



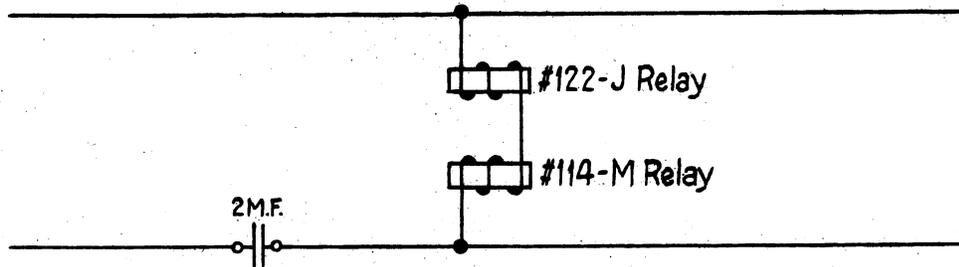
Retards		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#46-A	Ave.	.9	.6	.3	.7	.5	.3
	Lim.			.5			.4
#47-Y	Ave.	.3	.2	.1	.2	.2	.1
	Lim.			.5			.2
#1-B	Ave.	3.2	2.1	1.1	2.5	1.7	1.0
	Lim.			1.5			1.2

⊙ Estimated Loss

① #46-A = #47-A

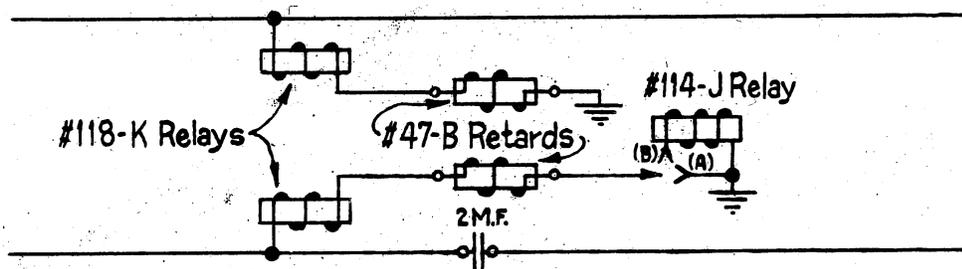
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

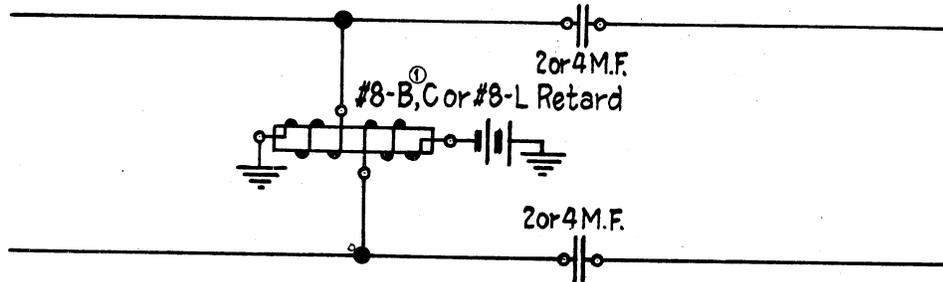
FIG. 2



Conditions.		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
(A)	Ave.						
	Lim.						
(B)	Ave.						
	Lim.						

TRANSMISSION CIRCUITS AND LOSSES

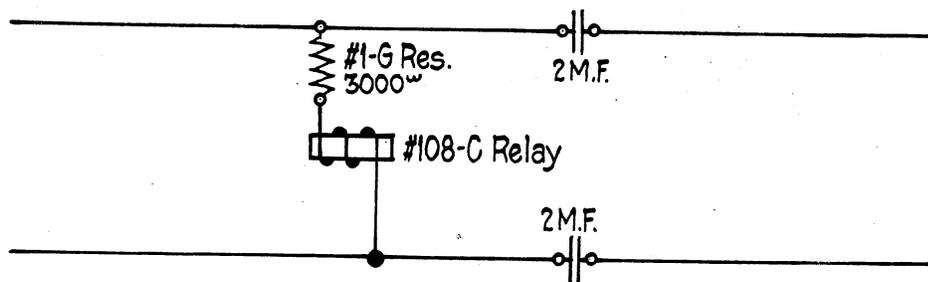
FIG. 1



Retard. and Condenser		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#8-C 2 M.F.	Ave.	.4	.4	.2	.3	.2	.2
	Lim.			.5			.3
#8-C 4 M.F.	Ave.	.4	.4	.1	.3	.2	.1
	Lim.			.5			.3
#8-L 2 M.F.	Ave.	.1	.1	.1	.1	.1	.1
	Lim.			.5			.2
#8-L 4 M.F.	Ave.	.1	.1	0	.1	.1	0
	Lim.			.5			.2

① #8-B = #8-C

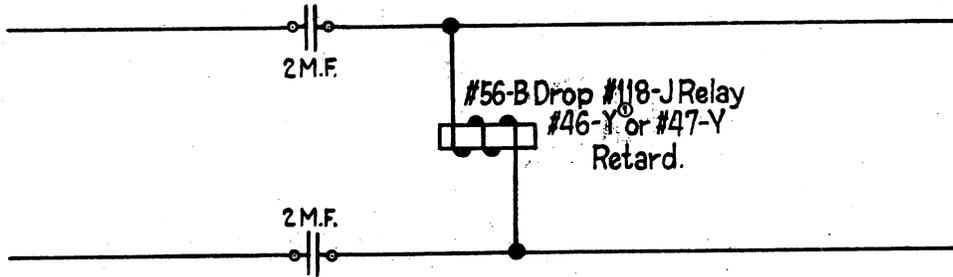
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim						

TRANSMISSION CIRCUITS AND LOSSES

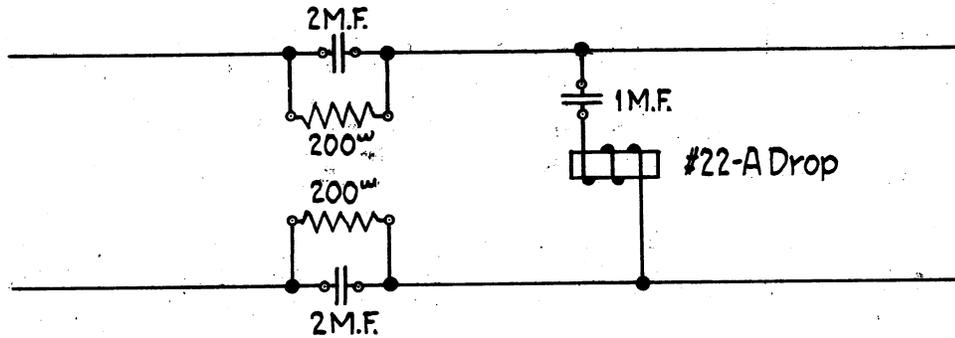
FIG. 1



Drop, Relay or Retard.		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
#56-B	Ave.	1.1	.8	.3	.9	.6	.3
	Lim.			.5			.4
#118-J	Ave.						
	Lim.						
#46-Y	Ave.	.3	.2	.1	.2	.1	.1
	Lim.			.5			.2

① #46-Y = #47-Y

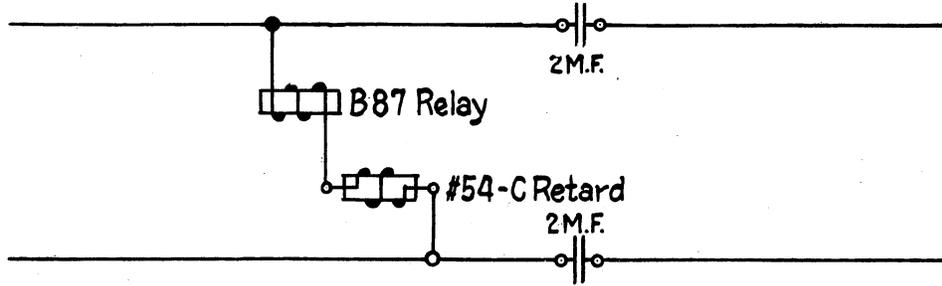
FIG. 2



		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
	Ave.						
	Lim.						

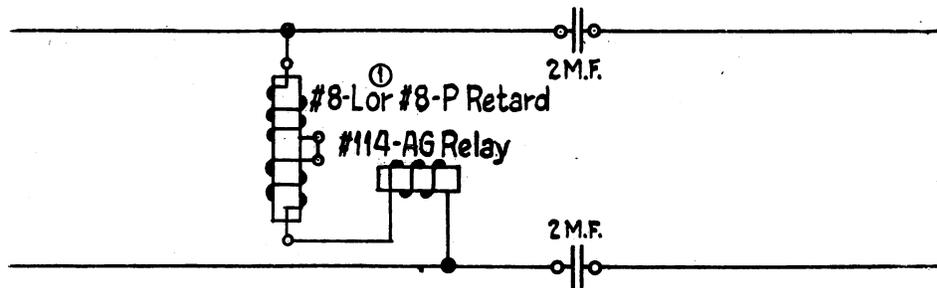
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.1	.1	.1	.1	.1	.1
	Lim.			.5			.2

FIG

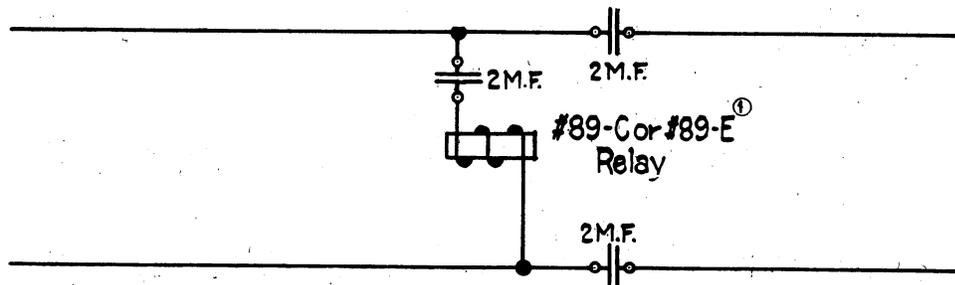


		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.1	.1	.1	.1	.1	.1
	Lim.			.5			.3

① #8-L=#8-P

TRANSMISSION CIRCUITS AND LOSSES

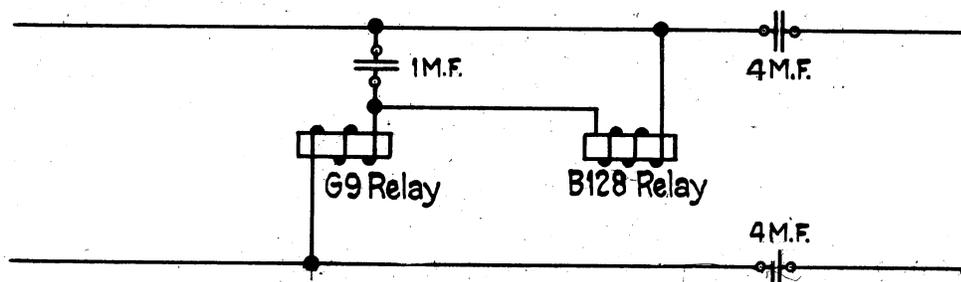
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.9	.6	.3	.7	.5	.3
	Lim.			.5			.4

① #89-C=#89-E

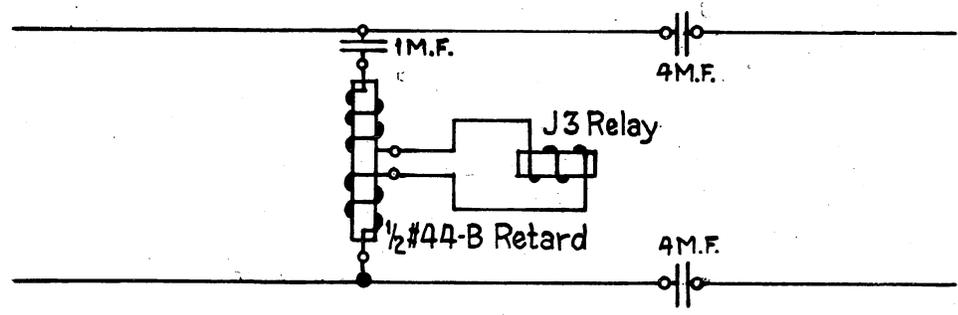
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

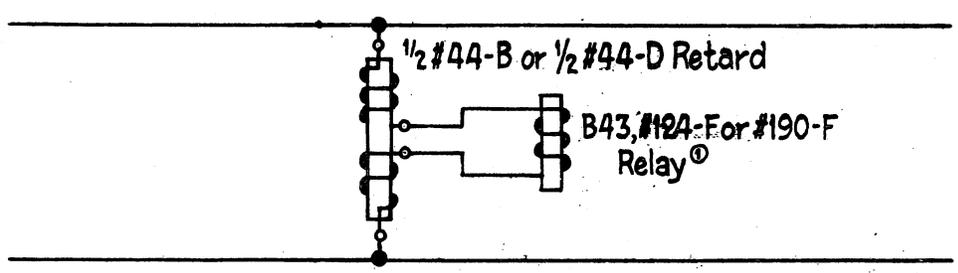
TRANSMISSION CIRCUITS AND LOSSES

FIG.



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
Ave.		0	0	0	0	0	0
Lim.				.5			.1

FIG. 2

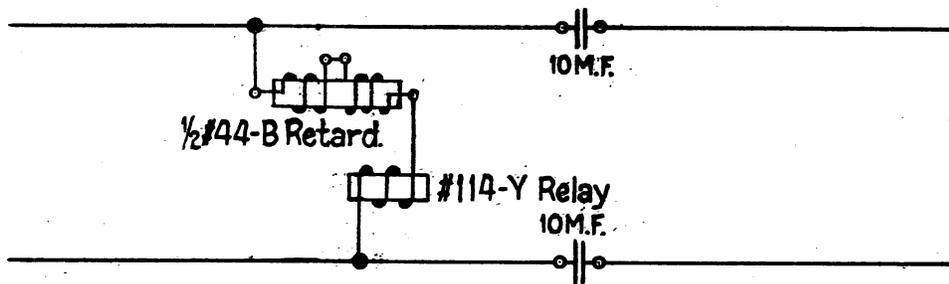


		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
Ave.		0	0	0	0	0	0
Lim.				.5			.1

① #124-F, B43, #190-F relays in this circuit cause the same loss.

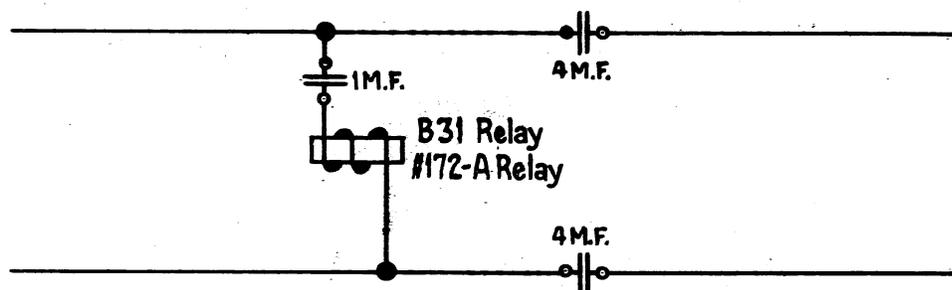
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

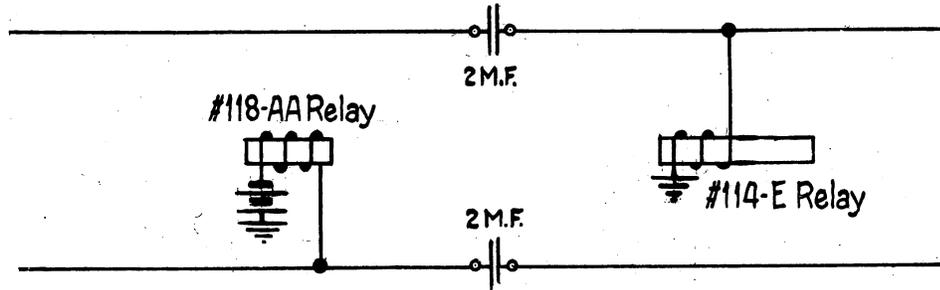
FIG. 2



Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
B31	Ave.	.4	.2	.1	.3	.2	.1
	Lim.			.5			.3
#172-A	Ave.	.6	.4	.2	.5	.3	.1
	Lim.			.5			.3

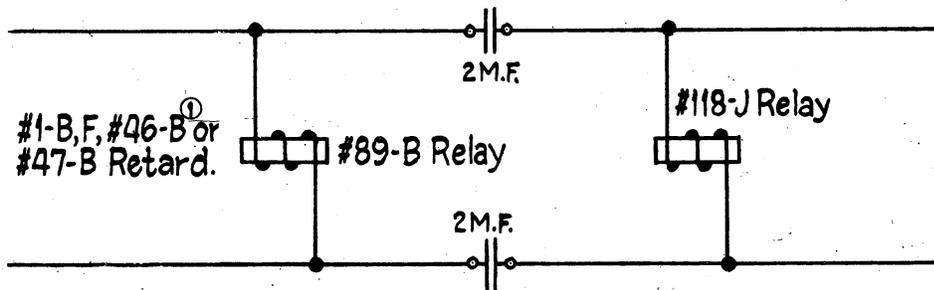
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.2	.1	.1	.1	.1	.1
	Lim.			.5			.3

FIG. 2

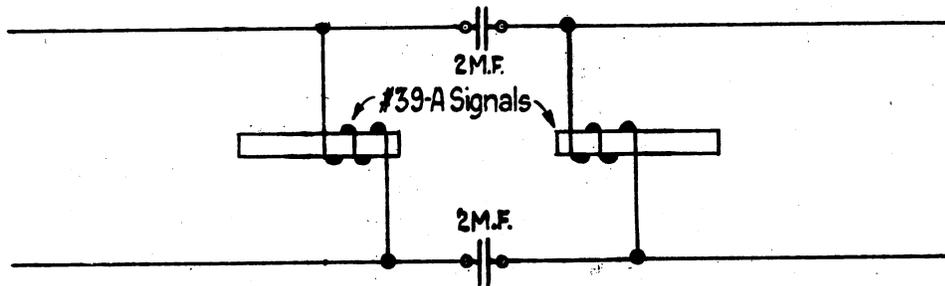


Relay or Retard.		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#89-B	Ave.						
	Lim.						
#1-B	Ave.						
	Lim.						
#1-F	Ave.						
	Lim.						
#46-B	Ave.						
	Lim.						

① #46-B = #47-B

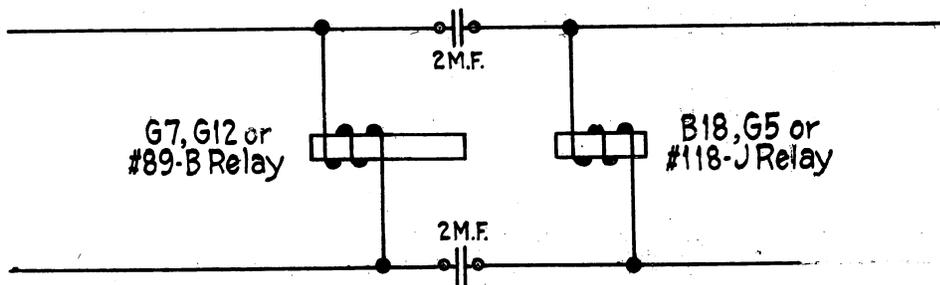
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	5.2	3.3	1.6	4.1	2.8	1.4
	Lim.			2.5			2.0

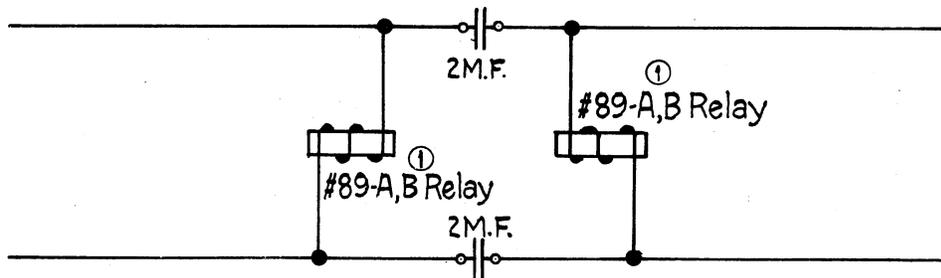
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

TRANSMISSION CIRCUITS AND LOSSES

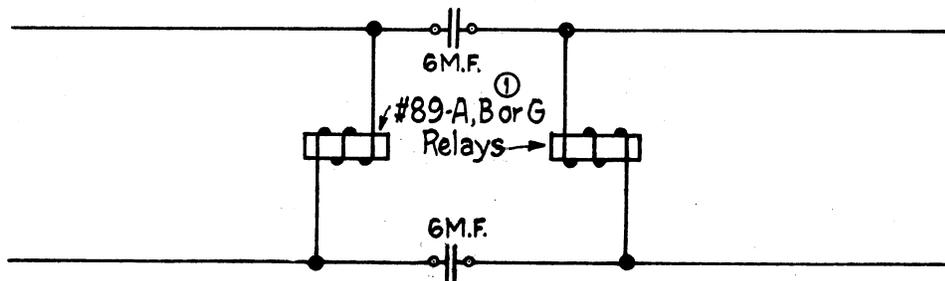
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.7	.9	.5	1.1	.8	.5
	Lim.			1.0			.7

① #89-A = #89-B

FIG. 2

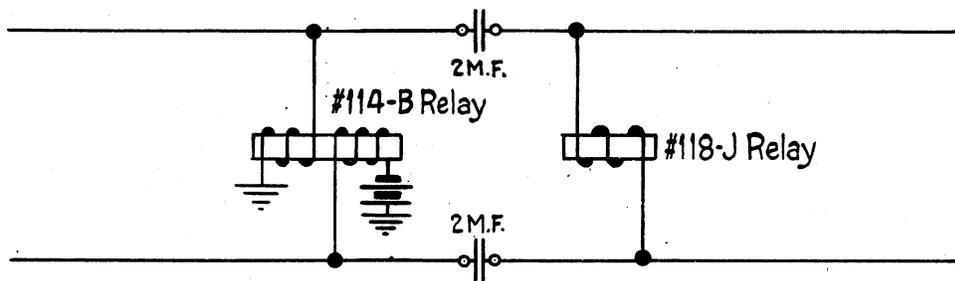


		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.7	.9	.4	1.1	.8	.4
	Lim.			1.0			.6

① #89-A = #89-B or #89-G

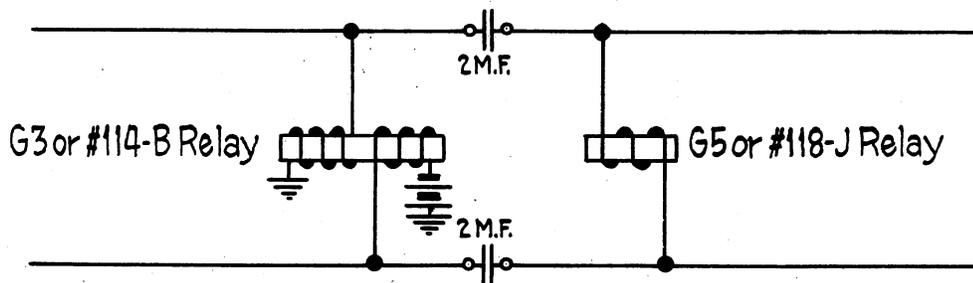
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



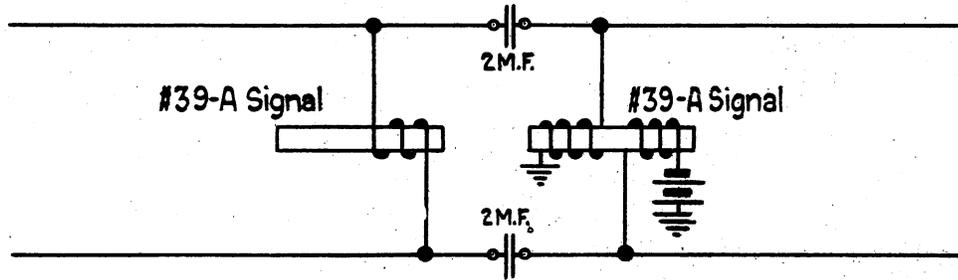
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

FIG. 2



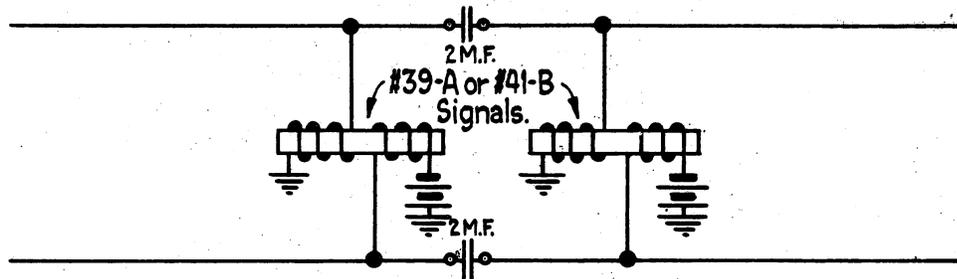
Relays		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
G3	Ave.	1.7	1.0	.5	1.1	.8	.4
G5	Lim.			1.0			.7
#114-B	Ave.						
#118-J	Lim.						

TRANSMISSION CIRCUITS AND LOSSES



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	3.2	2.1	1.0	2.5	1.7	.9
	Lim.			1.5			1.4

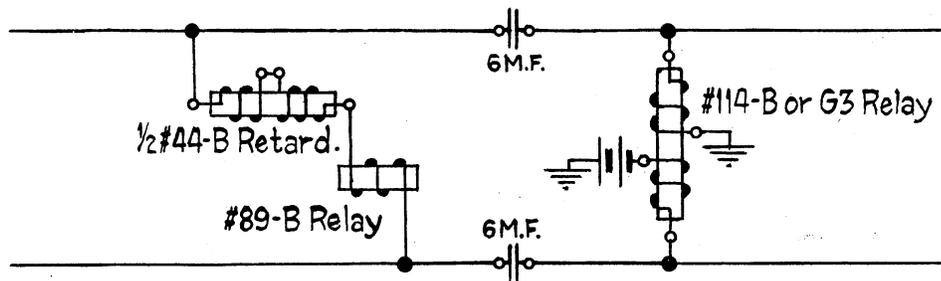
FIG. 2



Signals		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#39-A	Ave.	1.4	.9	.5	1.0	.7	.4
	Lim.			1.0			.6
#41-B	Ave.	2.9	1.8	.9	2.2	1.5	.8
	Lim.			1.5			1.1

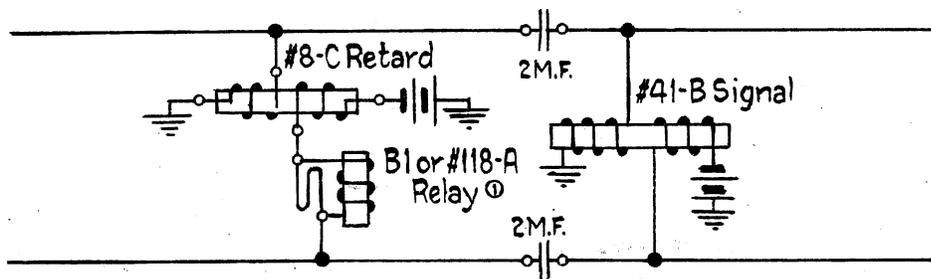
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Relay		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
G3	Ave.	1.1	.7	.3	.8	.6	.3
	Lim.			.5			.5
#114-B	Ave.						
	Lim.						

FIG. 2

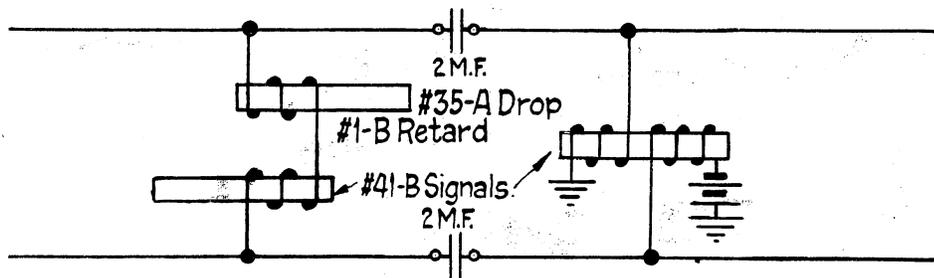


		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
	Ave.	1.8	1.0	.6	1.3	.9	.5
	Lim.			2.0			1.7

Ⓛ B1 or #118-A relays in this circuit cause the same loss.

TRANSMISSION CIRCUITS AND LOSSES

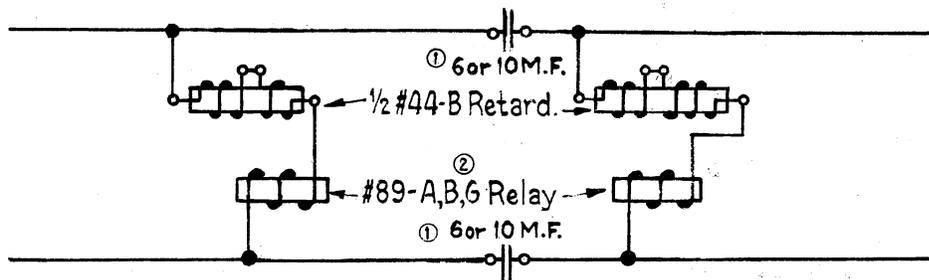
FIG. 1



Retard or Drop		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
#1-B ⊗	Ave.	3.7	2.3	1.1	2.7	1.9	1.0
	Lim.			1.5			1.4
#35-A	Ave.	3.4	2.1	1.0	2.6	1.7	.9
	Lim.			1.5			1.1

⊗ Estimated Loss

FIG. 2



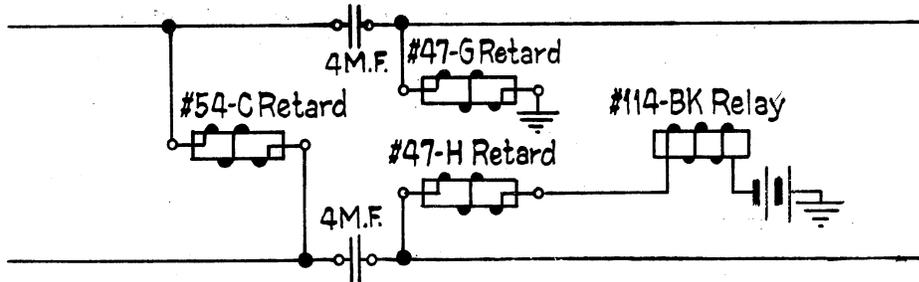
		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

① 6 M.F. or 10 M.F. condensers in this circuit cause the same loss.

② #89-A = #89-B = #89-G Relay

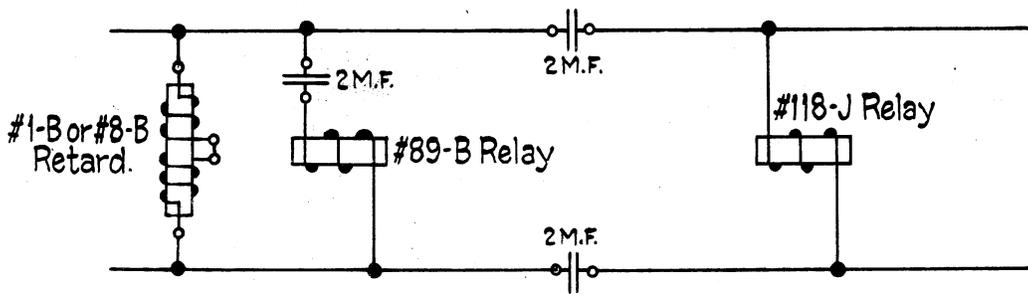
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

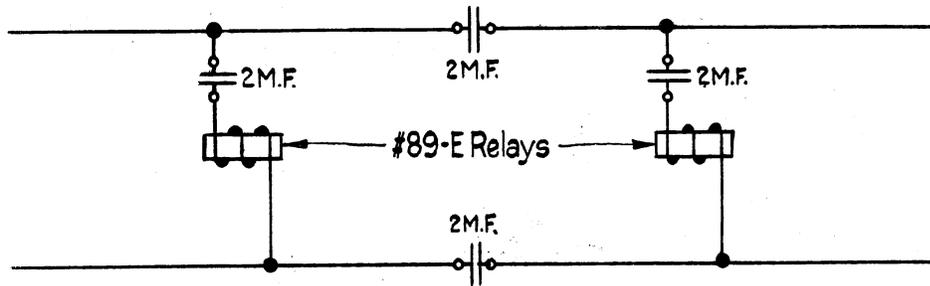
FIG. 2



Retard		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#1-B	Ave.						
	Lim.						
#8-B	Ave.						
	Lim.						

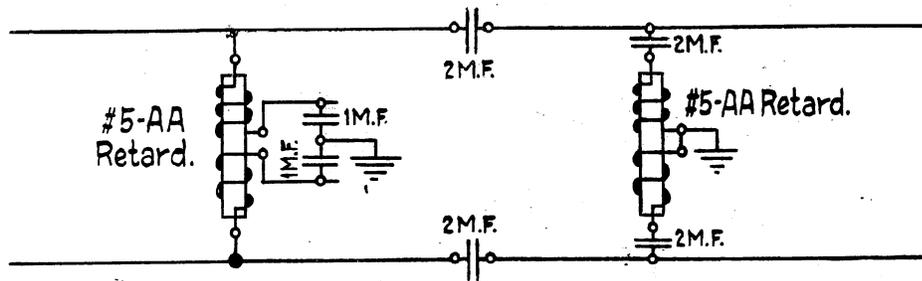
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.9	1.1	.6	1.4	.8	.5
	Lim.			1.0			.7

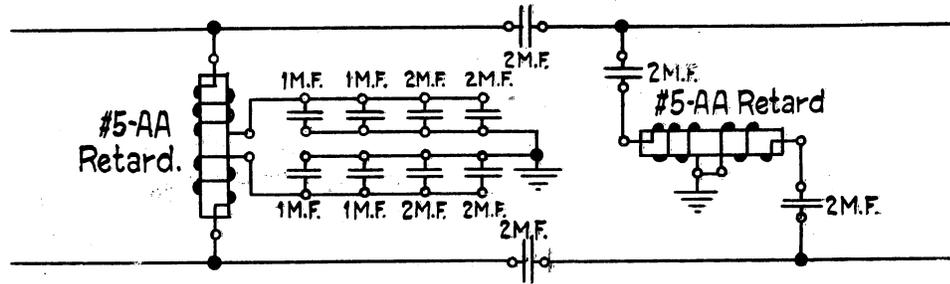
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	.1	0	0	.1
	Lim.			.5			.2

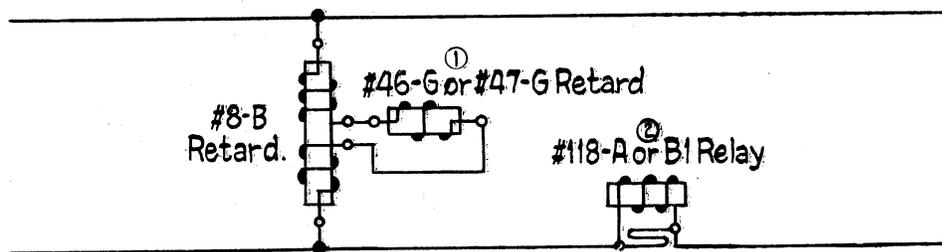
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	.1	0	0	.1
	Lim.			.5			.2

FIG. 2



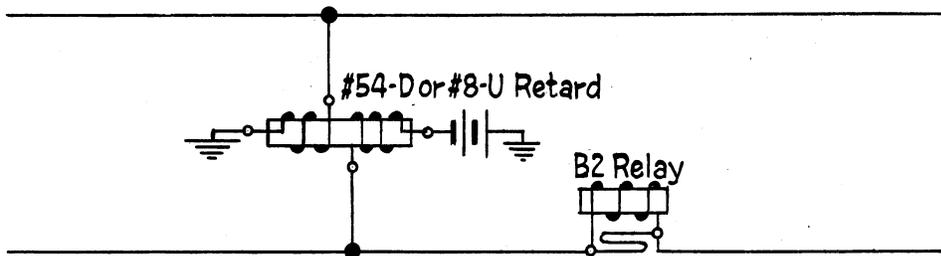
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave	.3	.3	.3	.3	.2	.3
	Lim			1.0			1.0

① #46-G = #47-G

② #118-A or B1 relays in this circuit cause the same loss.

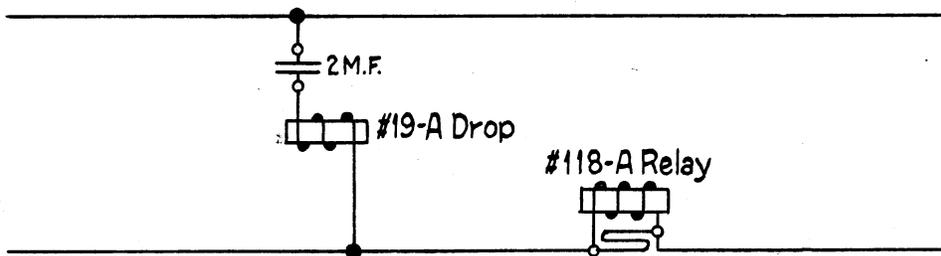
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Retard		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#54-D	Ave.	.5	.4	.3	.4	.3	.3
	Lim.			1.0			.8
#8-U	Ave.						
	Lim						

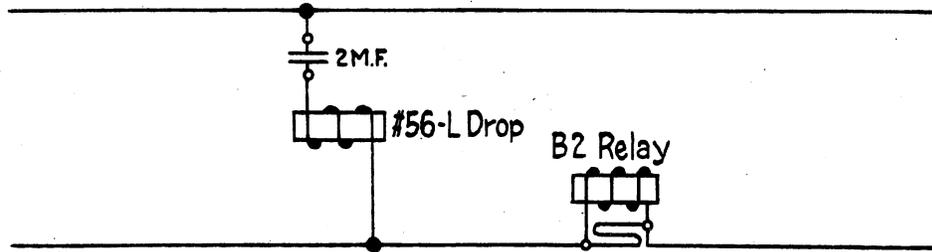
FIG. 2



		800 ^w			1000 ^w		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.6	1.0	.7	1.2	.9	.7
	Lim.			1.5			1.2

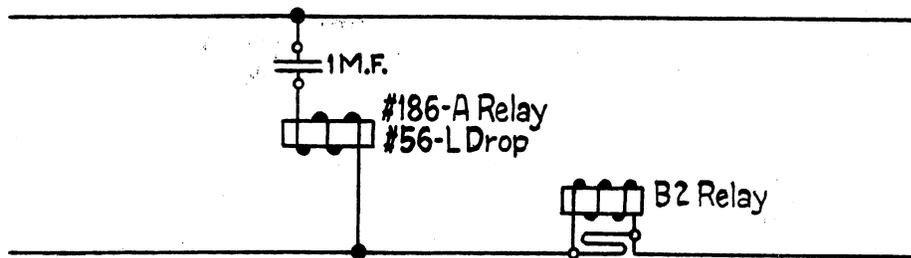
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
Ave.	1.2	.9	.5	.9	.7	.5	
Lim			1.0			1.0	

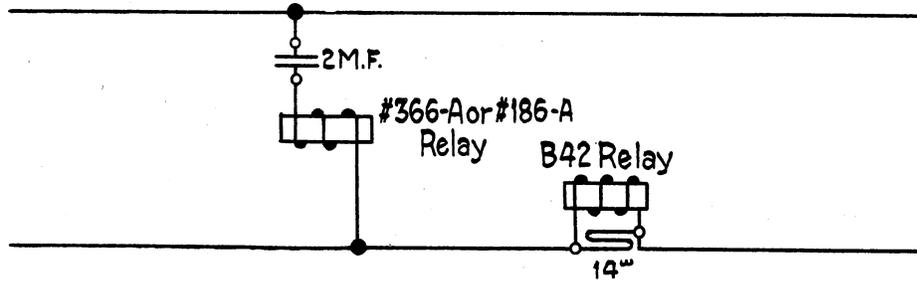
FIG. 2



Relay or Drop		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#186-A	Ave.	.7	.5	.4	.6	.4	.4
	Lim.			1.0			1.0
#56-L	Ave.	1.2	.9	.5	.9	.7	.5
	Lim.			1.0			1.0

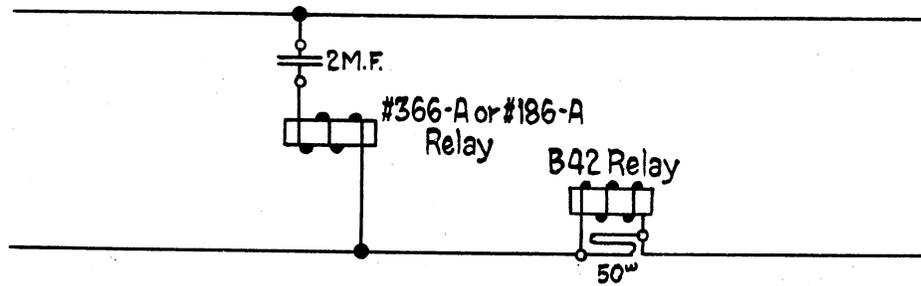
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#366-A	Ave.	.9	.6	.4	.7	.5	.4
	Lim.			1.5			1.1
#186-A	Ave.	.7	.5	.3	.6	.4	.3
	Lim.			1.0			1.0

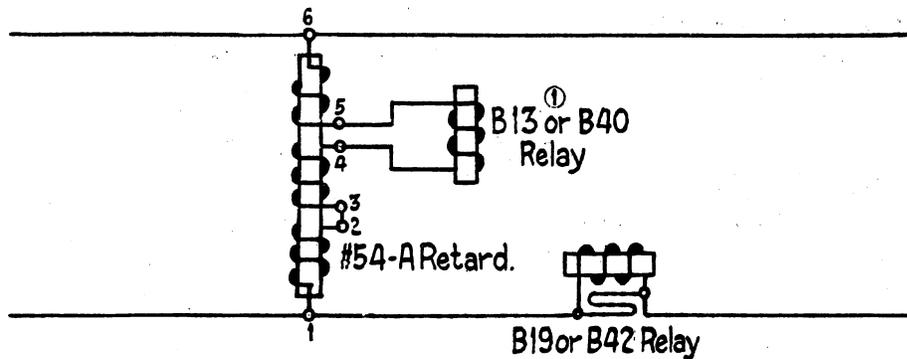
FIG. 2



Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#366-A	Ave	.9	.7	.7	.8	.7	.7
	Lim			1.5			1.4
#186-A	Ave	.7	.6	.6	.6	.6	.6
	Lim			1.5			1.3

TRANSMISSION CIRCUITS AND LOSSES

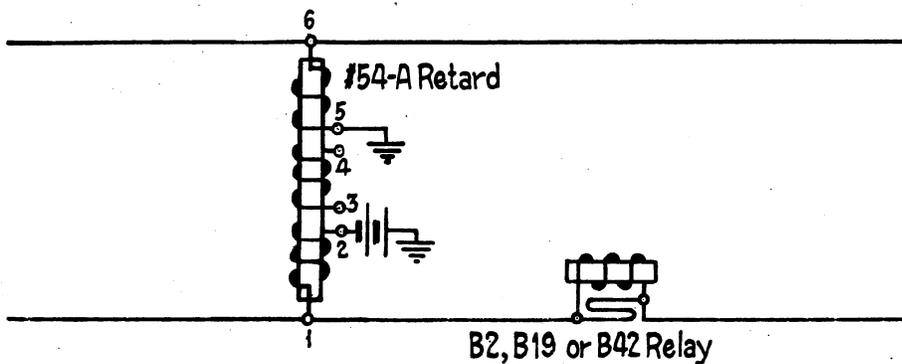
FIG. 1



Relay		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
B19 10 ^w	Ave.	.1	.1	.1	.1	.1	.1
	Lim.			1.0			1.0
B42 14 ^w	Ave.	.1	.1	.1	.1	.1	.1
	Lim.			1.0			1.0

① B13 or B40 relays in this circuit cause the same loss.

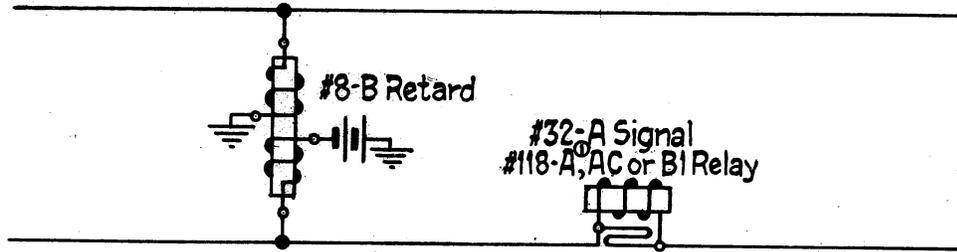
FIG. 2



Relays.		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
B2	Ave.	.4	.3	.2	.3	.2	.2
	Lim.			1.5			1.1
B19 100 ^w	Ave.	.5	.5	.8	.5	.5	.8
	Lim.			2.0			1.7
B42 50 ^w	Ave.	.4	.3	.4	.3	.3	.4
	Lim.			1.5			1.3

TRANSMISSION CIRCUITS AND LOSSES

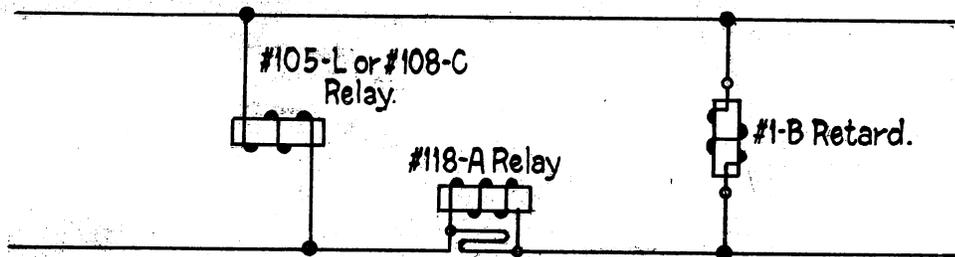
FIG. 1



Relay or Signal		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#118-A	Ave.	.4	.3	.3	.3	.3	.3
	Lim.			1.0			.9
B1	Ave.	.4	.3	.3	.3	.3	.3
	Lim.			1.0			.9
#32-A	Ave.	.6	.6	.9	.5	.6	.8
	Lim.			1.5			1.4

① #118-A = #118-AC Relay

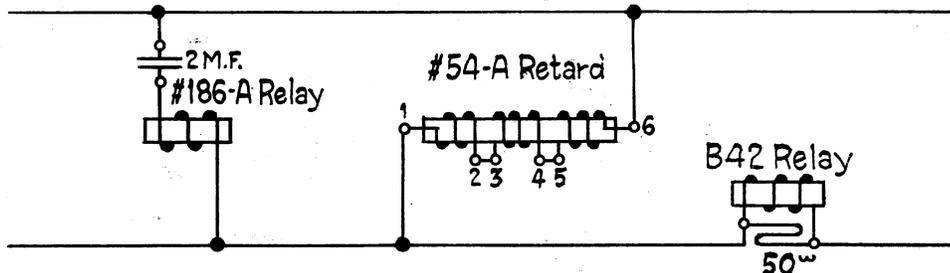
FIG. 2



Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#105-L	Ave.						
	Lim.						
#108-C	Ave.						
	Lim.						

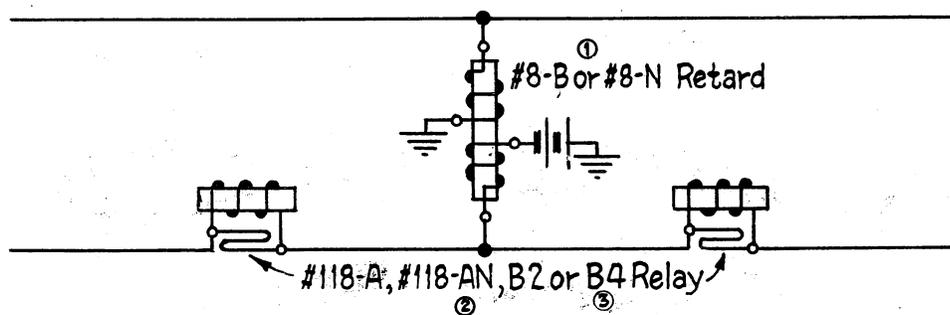
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.7	.6	.6	.6	.6	.6
	Lim.			2.0			1.6

FIG. 2

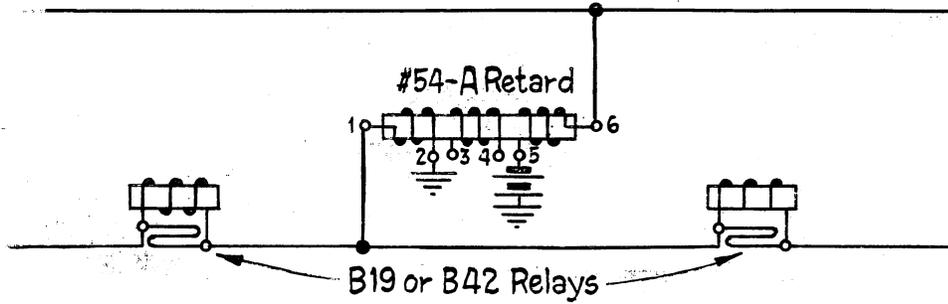


Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#118-A	Ave.	.4	.4	.5	.4	.4	.5
	Lim.			1.5			1.3
B2	Ave.	.4	.4	.4	.4	.4	.4
	Lim.			1.5			1.2

① #8-B = #8-N
 ② #118-A = #118-AN
 ③ B2 = B4.

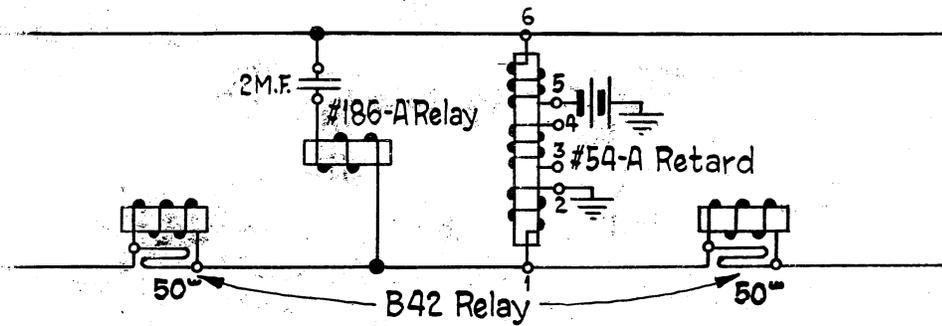
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Relay		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
B19 100~	Ave.	.7	.8	1.4	.7	.9	1.3
	Lim.			2.5			2.3
B42 50~	Ave.	.5	.5	.7	.5	.5	.7
	Lim.			2.0			1.6

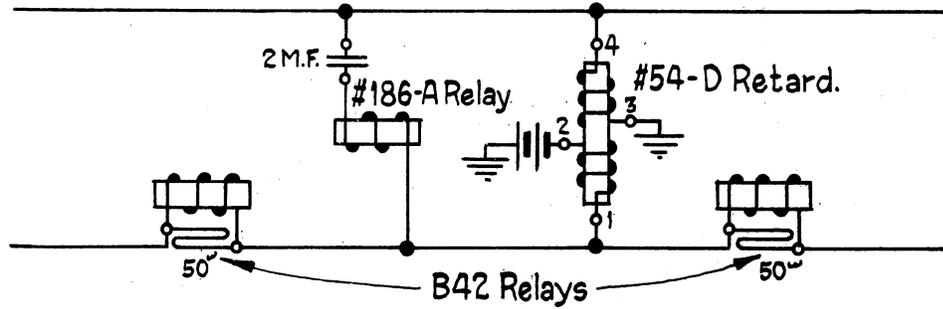
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.1	.9	.9	.9	.9	.9
	Lim.			2.5			2.3

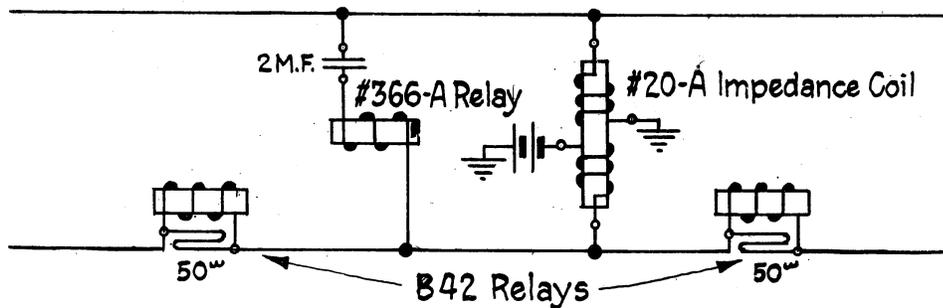
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



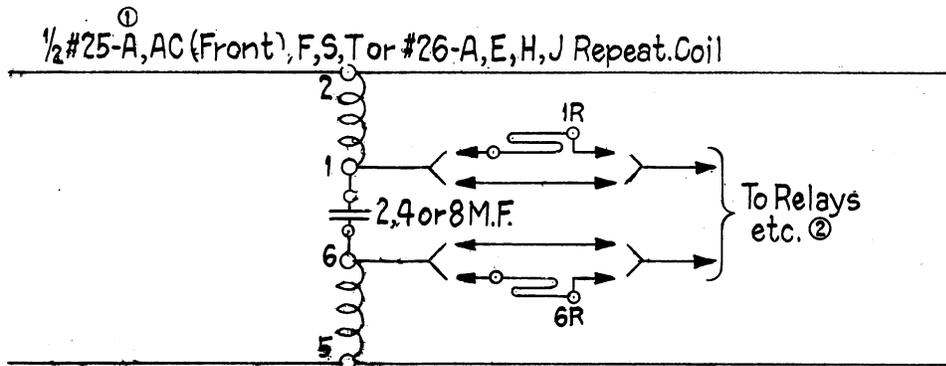
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.3	1.0	.9	1.0	.9	.9
	Lim.			2.5			2.2

FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.6	1.2	1.2	1.2	1.0	1.0
	Lim.			2.5			2.3

TRANSMISSION CIRCUITS AND LOSSES



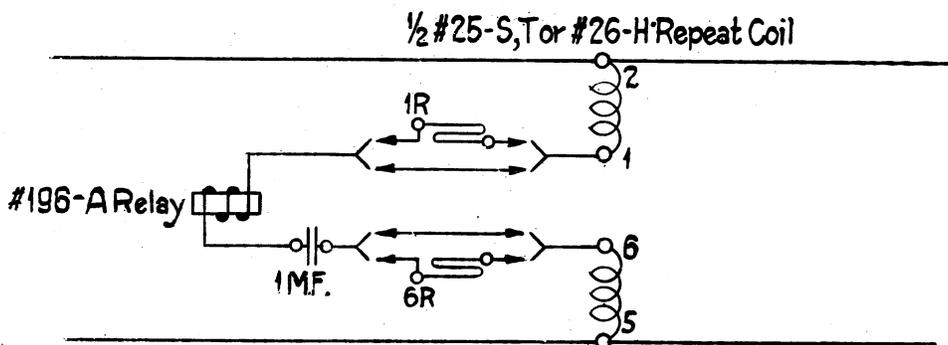
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.3	.1	0	.2	.1	0
	Lim.			.5			.1

① $\frac{1}{2}$ #25-A = F = S = T = #26-A = E = H = J = #25-AC (Front Coil).

② Apparatus usually connected here has practically no effect on the transmission loss.

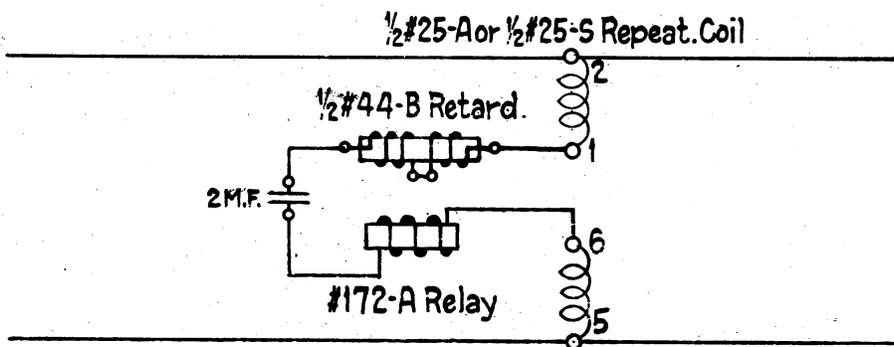
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1.



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim			.5			.1

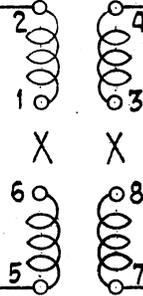
FIG. 2.



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	0	0	0	0	0	0
	Lim.			.5			.1

TRANSMISSION CIRCUITS AND LOSSES

$\frac{1}{2}$ #25-A, #26-A,^① #37-A,B, $\frac{1}{2}$ #46-A, $\frac{1}{2}$ #55-A,B,C,D,E,^② #75-A or #76-A Repeat Coil^③



Repeat Coil		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
$\frac{1}{2}$ #25-A	Ave.	.6	.5	.7	.4	.4	.7
	Lim			1.0			.9
#37-A	Ave						
	Lim						
#37-B	Ave						
	Lim						
$\frac{1}{2}$ #46-A	Ave	.4	.4	.7	.4	.4	.7
	Lim			1.0			.9
$\frac{1}{2}$ #55-A	Ave	.3	.4	.7	.3	.4	.8
	Lim			1.0			.9
$\frac{1}{2}$ #55-B	Ave	.5	.5	.8	.5	.5	.8
	Lim			1.0			.9
$\frac{1}{2}$ #55-D	Ave.	1.2	1.2	1.4	1.2	1.2	1.5
	Lim.			2.0			1.7
#75-A	Ave.	.3	.4	.7	.3	.4	.8
	Lim.			1.0			.9
#76-A	Ave.	.4	.4	.7	.4	.4	.7
	Lim.			1.0			.9

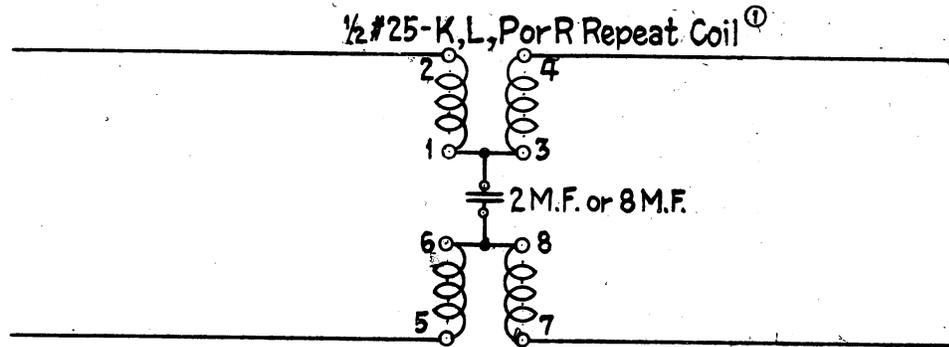
① $\frac{1}{2}$ #25-A = #26-A

② $\frac{1}{2}$ #55-C = $\frac{1}{2}$ #55-B

③ $\frac{1}{2}$ #55-E = $\frac{1}{2}$ #55-D

NOTE - X may be short, battery and ground or condenser (2, 4 or 8 M.F.)

TRANSMISSION CIRCUITS AND LOSSES

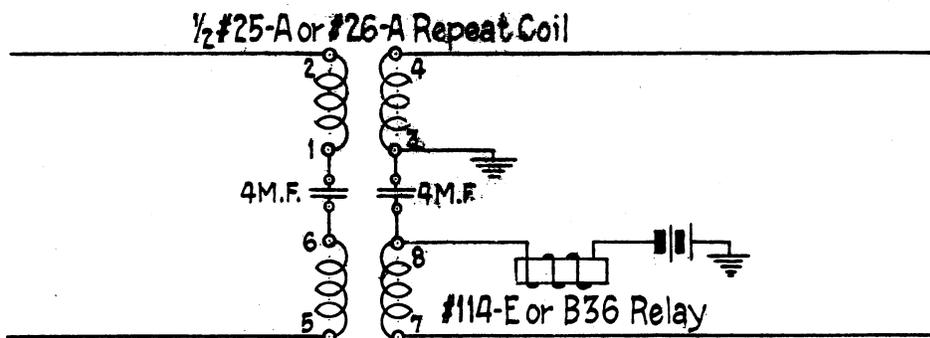


Repeat. Coil		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
½ #25-P	Ave.	2.6	2.6	2.9	2.6	2.6	2.9
	Lim.			3.5			3.2
½ #25-R	Ave.	1.1	1.0	1.2	1.0	1.0	1.2
	Lim.			1.5			1.5

^① #25-K = #25-P #25-L = #25-R

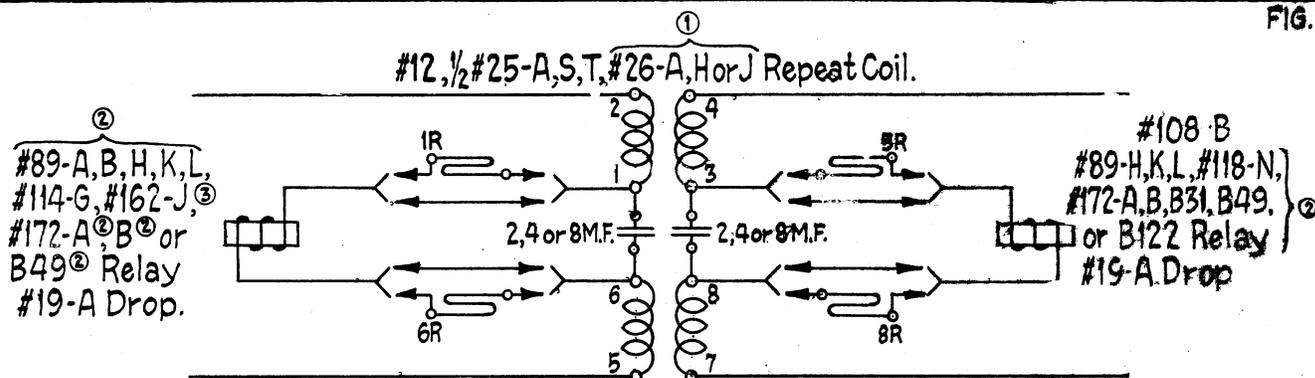
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Relays		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#114-E	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9
B36	Ave.	.6	.6	.8	.4	.4	.7
	Lim.			1.0			.9

FIG. 2



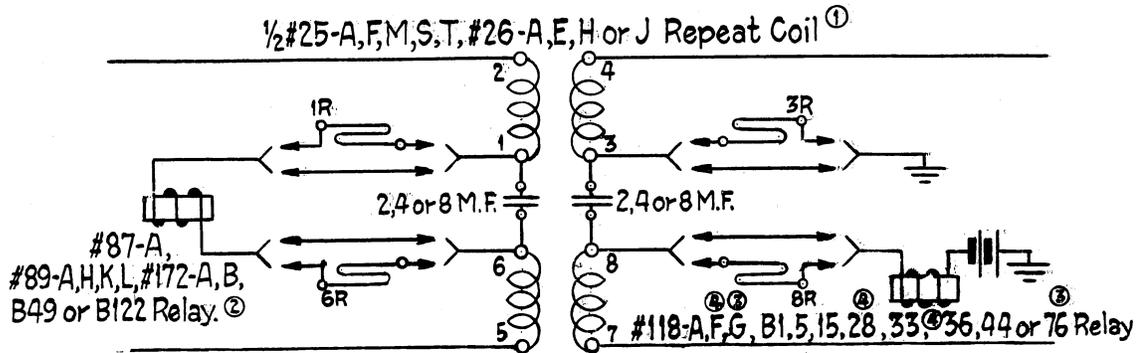
Relays Drops	Repeat Coil		800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
B49 and B49	½ #25-A, S or T	Ave.	.6	.5	.7	.4	.4	.7
		Lim.			1.0			.9
#114-G and #108-B	½ #25-A	Ave.	.6	.6	.8	.4	.4	.7
		Lim.			1.0			.9
#19-A and #19-A	#12	Ave.						
		Lim.						

① #26-A = ½ #25-A #26-H = ½ #25-S #26-J = ½ #25-T

② #89-A, B, H, K, L, #118-N, #172-A, B, B31 and B122 relays cause the same loss in this circuit as the B49.

③ #162-J relay causes the same loss in this circuit as the #114-G

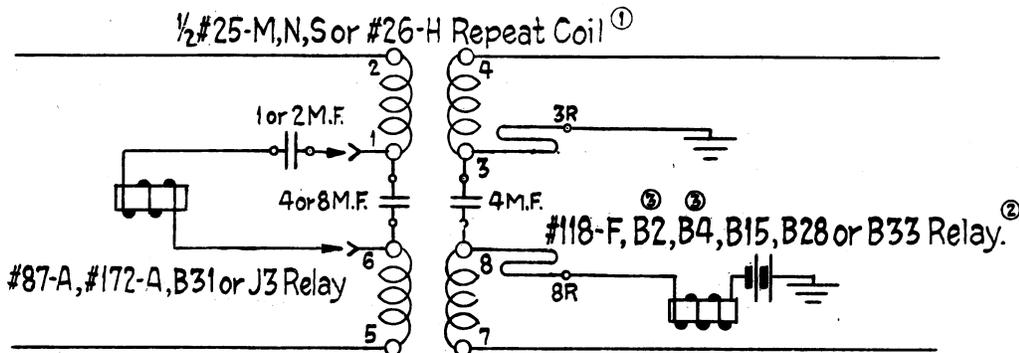
TRANSMISSION CIRCUITS AND LOSSES



Repeat Coil	Relays	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
$\frac{1}{2}$ #25-A	#89-H and #118-A	Ave	.7	.6	.9	.5	.5	.9
		Lim			1.5			1.1
	#89-K and B5	Ave	.6	.6	.9	.4	.5	.8
		Lim			1.5			1.0
	#89-L and B36	Ave	.7	.7	1.0	.5	.5	.9
		Lim			1.5			1.1
#172-A and B1	Ave	.6	.6	.8	.4	.5	.8	
	Lim			1.0			1.0	
$\frac{1}{2}$ #25-F	#89-A(8M.F.) #118-A(4M.F.)	Ave	.6	.6	.8	.4	.5	.8
		Lim			1.0			1.0
	#89-A(8M.F.) #118-A(8M.F.)	Ave	.6	.5	.7	.4	.4	.7
		Lim			1.0			.9
$\frac{1}{2}$ #25-M	#87-A and B15	Ave	1.1	1.1	1.3	1.0	1.0	1.2
		Lim			2.0			1.5
$\frac{1}{2}$ #25-S	#89-A and 315	Ave	.6	.6	.8	.4	.4	.7
		Lim			1.0			.9
	#89-K and B5	Ave	.6	.5	.7	.4	.4	.7
		Lim			1.0			.9
$\frac{1}{2}$ #25-T	#89-K and B15	Ave	.6	.6	.8	.4	.4	.7
		Lim			1.0			.9

- ① $\frac{1}{2}$ #25-A = #26-A $\frac{1}{2}$ #25-F = #26-E $\frac{1}{2}$ #25-S = #26-H $\frac{1}{2}$ #25-T = #26-J.
- ② #89-A = H = K = L and #172-B, B49 and B122 cause the same loss in this circuit.
- ③ #118-G and B76 cause the same loss as B5 in this circuit.
- ④ B28 = B33 = B15 = #118-F

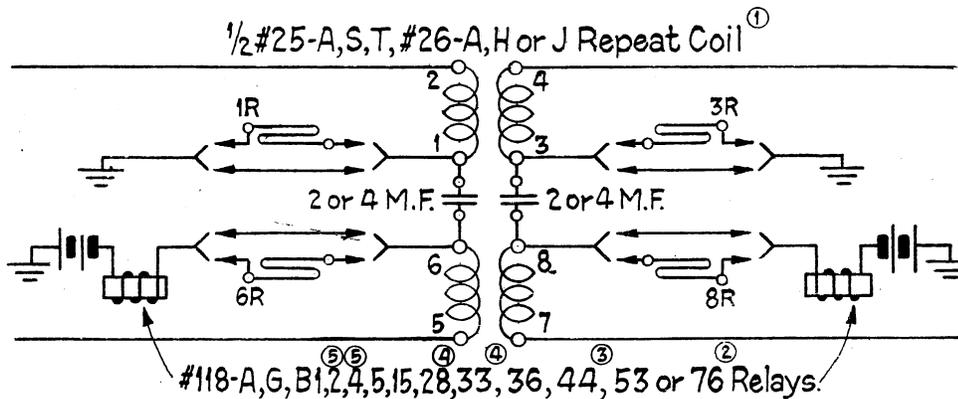
TRANSMISSION CIRCUITS AND LOSSES



Relay	Repeat. Coil	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
#118-F	$\frac{1}{2}$ #25-M	Ave.	1.1	1.1	1.3	1.0	1.0	1.2
		Lim			2.0			1.5
	$\frac{1}{2}$ #25-N	Ave.	2.6	2.7	3.0	2.6	2.6	2.9
		Lim			3.5			3.2
	$\frac{1}{2}$ #25-S	Ave.	6	.6	.8	.4	.4	.7
		Lim			1.0			.9
B2	Ave.							
	Lim.							

① #26-H = $\frac{1}{2}$ #25-S
 ② B15 = B28 = B33 = #118-F
 ③ B4 = B2

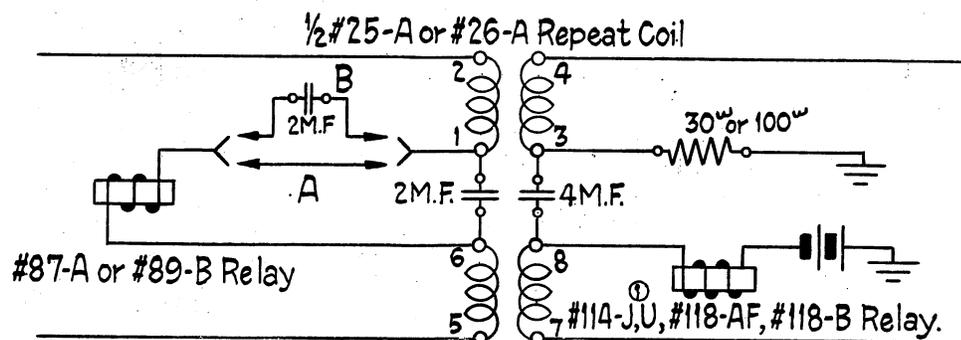
TRANSMISSION CIRCUITS AND LOSSES



Repeat Coils	Relays		800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
1/2 #25-A 2M.F.-2M.F.	#118-A and #118-A	Ave.	.7	.7	1.0	.5	.6	1.0
		Lim.			1.5			1.3
	#118-G and #118-G	Ave.	.7	.7	.9	.5	.6	.9
		Lim.			1.5			1.1
	B36 and B36	Ave.	.8	.9	1.3	.6	.6	1.0
		Lim.			2.0			1.3
B1 and B1	Ave.	.7	.6	.9	.5	.5	.9	
	Lim.			1.5			1.1	
B5 and B5	Ave.	.7	.7	.9	.5	.6	.9	
	Lim.			1.5			1.2	
1/2 #25-S 2M.F.-4M.F.	B44 and B28	Ave.	.6	.6	.8	.4	.4	.7
		Lim.			1.0			.9
1/2 #25-T 4M.F.-4M.F.	B15 and B15	Ave.	.6	.6	.9	.4	.5	.8
		Lim.			1.5			1.0
	B53 and B53	Ave.	.7	.7	.9	.5	.6	.9
		Lim.			1.5			1.1

- ① 1/2 #25-A = #26-A 1/2 #25-S = #26-H 1/2 #25-T = #26-J
- ② B76 cause the same loss in this circuit as #118-G
- ③ B44 " " " " " " " " B5
- ④ B28 = B33 = B15
- ⑤ B2 and B4 cause the same loss in this circuit as B53.

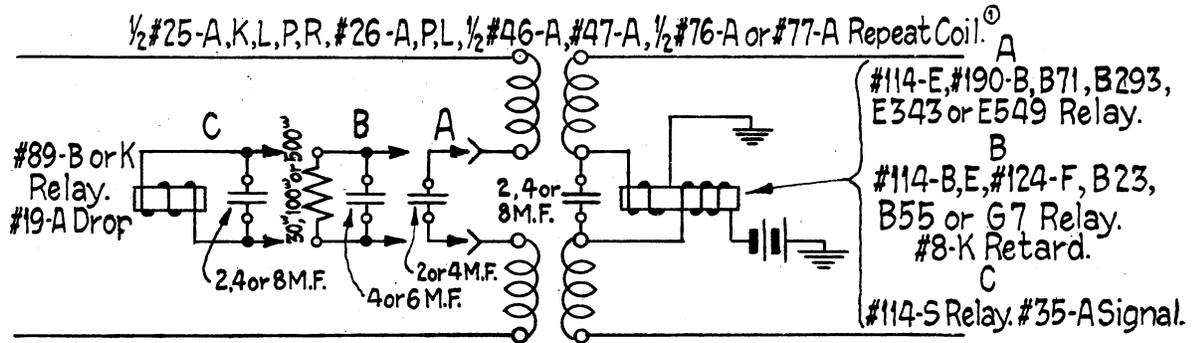
TRANSMISSION CIRCUITS AND LOSSES



Con- ditions	Relays	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
A	#89-B and #118-AF	Ave.	.6	.5	.7	.4	.4	.7
		Lim.			1.0			.9
B	#87-A and #118-B	Ave	.6	.5	.7	.4	.4	.7
		Lim			1.0			.9

① #114-J and #114-U cause the same loss in this circuit as #118-AF.

TRANSMISSION CIRCUITS AND LOSSES

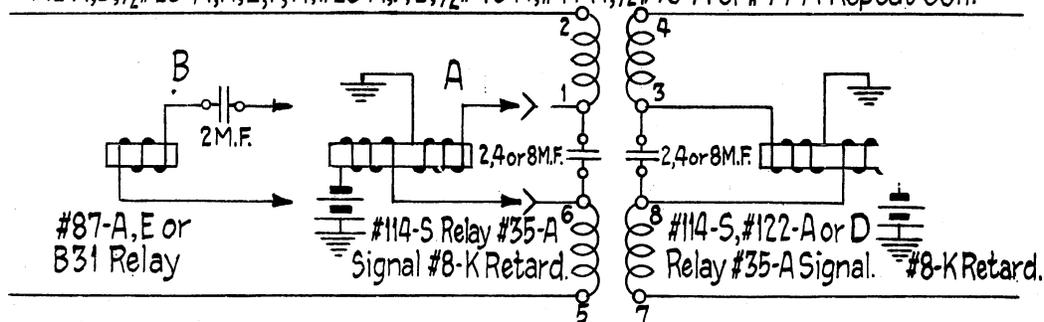


Con- ditions	Repeat Coil	Resistance, Relay, Drop and Signal.	800~			1000~			
			2200 H	1300 M	600 L	1800 H	1200 M	600 L	
A	$\frac{1}{2}$ #25-A		Ave.	.6	.5	.7	.4	.4	.7
			Lim.			1.0			.9
B	$\frac{1}{2}$ #25-A	500 ^w	Ave.	.6	.5	.7	.4	.4	.7
			Lim.			1.0			.9
	$\frac{1}{2}$ #25-P	500 ^w	Ave.	2.6	2.6	2.9	2.6	2.6	2.9
			Lim.			3.5			3.2
	$\frac{1}{2}$ #25-P	30 ^w	Ave.	2.6	2.7	3.1	2.6	2.7	3.0
			Lim.			3.5			3.3
	$\frac{1}{2}$ #25-R	500 ^w	Ave.	1.1	1.0	1.2	1.0	1.0	1.2
			Lim.			1.5			1.5
	$\frac{1}{2}$ #25-R	30 ^w	Ave.	1.1	1.1	1.4	1.0	1.1	1.3
			Lim.			2.0			1.6
	$\frac{1}{2}$ #46-A	100 ^w	Ave.	.4	.5	.8	.4	.4	.8
			Lim.			1.0			1.0
C	$\frac{1}{2}$ #25-A	#89-K #114-S(4M.F.)	Ave.	.6	.6	.8	.4	.4	.7
			Lim.			1.0			.9
		#89-K #114-S(8M.F.)	Ave.	.6	.5	.7	.4	.4	.7
			Lim.			1.0			.9
		#19-A(2M.F.) #35-A(2M.F.)	Ave.						
			Lim.						

[ⓐ] $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-P=#26-P $\frac{1}{2}$ #25-K $\frac{1}{2}$ #25-R= $\frac{1}{2}$ #25-L=#26-L $\frac{1}{2}$ #46-A=#47-A= $\frac{1}{2}$ #76-A=#77-A.

TRANSMISSION CIRCUITS AND LOSSES

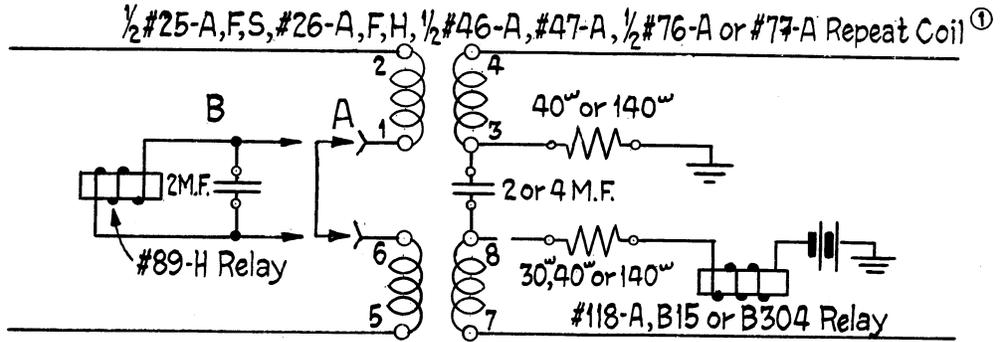
#12-A,B, 1/2 #25-A,K,L,P,R, #26-A,P,L, 1/2 #46-A, #47-A, 1/2 #76-A or #77-A Repeat Coil. ^①



Con- ditions	Repeat Coil.	Relay etc.	Condensers	800~			1000~			
				2200	1300	600	1800	1200	600	
				H	M	L	H	M	L	
A	1/2 #25-A	#114-S	4M.F. and 4M.F.	Ave.	.6	.6	.9	.4	.5	.8
			Lim.			1.5			1.0	
		#114-S	8M.F. and 8M.F.	Ave.	.6	.5	.7	.4	.4	.7
			Lim.			1.0			.9	
	#114-S	8M.F. and 4M.F.	Ave.	.6	.5	.7	.4	.4	.7	
		Lim.			1.0			.9		
	#8-K	4M.F. and 4M.F.	Ave.							
		Lim.								
#12-A,B	#35-A	2M.F. and 2M.F.	Ave.							
		Lim.								
B	1/2 #25-A		Ave.	.6	.5	.7	.4	.4	.7	
		Lim.			1.0			.9		
	1/2 #25-P		Ave.	2.6	2.6	2.9	2.6	2.6	2.9	
		Lim.			3.5			3.2		
	1/2 #25-R		Ave.	1.1	1.0	1.2	1.0	1.0	1.2	
		Lim.			1.5			1.5		
	1/2 #46-A		Ave.	.4	.4	.7	.4	.4	.7	
		Lim.			1.0			1.0		

^① 1/2 #25-A=#26-A=#12-A=#12-B 1/2 #25-P=#26-P=1/2 #25-K 1/2 #25-R=1/2 #25-L=#26-L
1/2 #46-A=#47-A=1/2 #76-A=#77-A

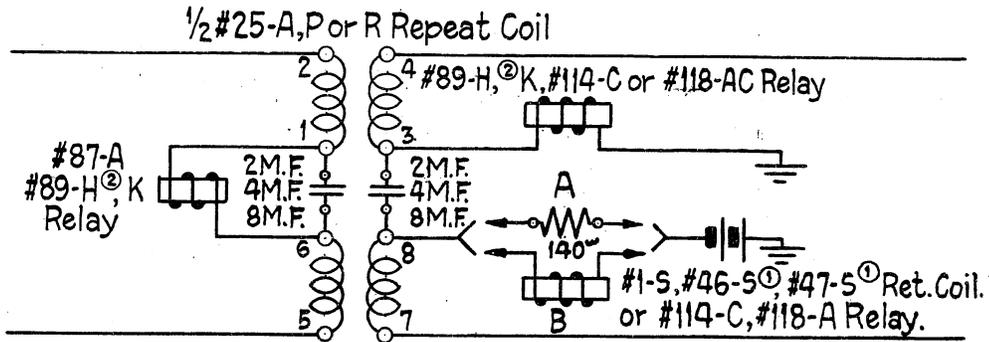
TRANSMISSION CIRCUITS AND LOSSES



Conditions and Repeat Coils.	Relays and Condensers.	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
A	$\frac{1}{2}$ #25-A (140 ^w) #118-A (2M.F.)	Ave.	.6	.6	.8	.4	.5	.8
		Lim.			1.5			1.0
	$\frac{1}{2}$ #25-FS or #26-F (40 ^w) #118-A (4M.F.)	Ave.	.6	.6	.8	.4	.5	.8
		Lim.			1.0			1.0
	$\frac{1}{2}$ #46-A (40 ^w) (30 ^w) B15 (4M.F.)	Ave.	.4	.5	.8	.4	.4	.7
		Lim.			1.0			.9
$\frac{1}{2}$ #46-A (40 ^w) (30 ^w) B304 (4M.F.)	Ave.	.4	.5	.8	.4	.5	.8	
	Lim.			1.0			1.0	
B	$\frac{1}{2}$ #25-A (140 ^w) #118-A (2M.F.)	Ave.	.6	.6	.8	.4	.5	.8
		Lim.			1.5			1.0

^① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-S=#26-H $\frac{1}{2}$ #46-A=#47-A= $\frac{1}{2}$ #76-A=#77-A.

TRANSMISSION CIRCUITS AND LOSSES



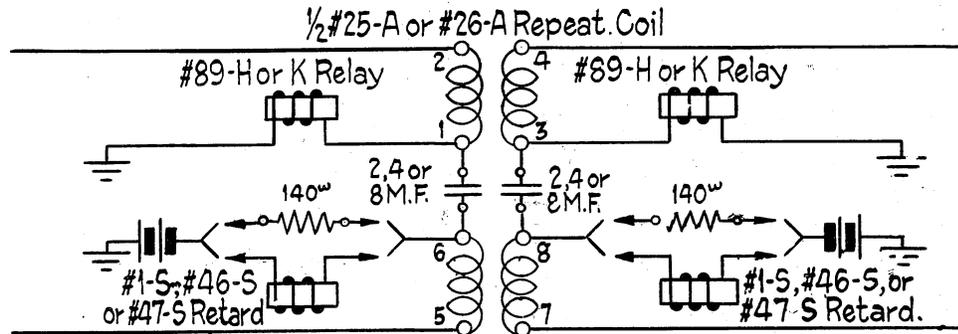
Con- ditions	Repeat Coil	Relays	800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
A	1/2 #25-A	#89-H Ave.	.6	.5	.7	.4	.4	.7
		#89-H Lim.			1.0			.9
B	1/2 #25-A	#87-A Ave.	.6	.5	.7	.4	.4	.7
		#114-C Lim.			1.0			.9
		#89-K Ave.	.6	.5	.7	.4	.4	.7
		#89-K #1-S Ret. Lim.			1.0			.9
		#87-A Ave.	.6	.6	.9	.4	.5	.8
	#118-AC #118-A Lim.			1.5			1.0	
	1/2 #25-P	#87-A Ave.	2.6	2.6	2.9	2.6	2.6	2.9
		#114-C Lim.			3.5			3.2
		#87-A Ave.	2.6	2.7	3.1	2.6	2.7	2.9
		#118-AC #118-A Lim.			3.5			3.2
1/2 #25-R	#87-A Ave.	1.1	1.0	1.2	1.0	1.0	1.2	
	#114-C Lim.			1.5			1.5	
	#87-A Ave.	1.1	1.1	1.4	1.0	1.1	1.3	
	#118-AC #118-A Lim.			2.0			1.6	

① #46-S = #47-S Ret. Coil cause the same loss in this circuit as #1-S.

② #89-H = #89-K.

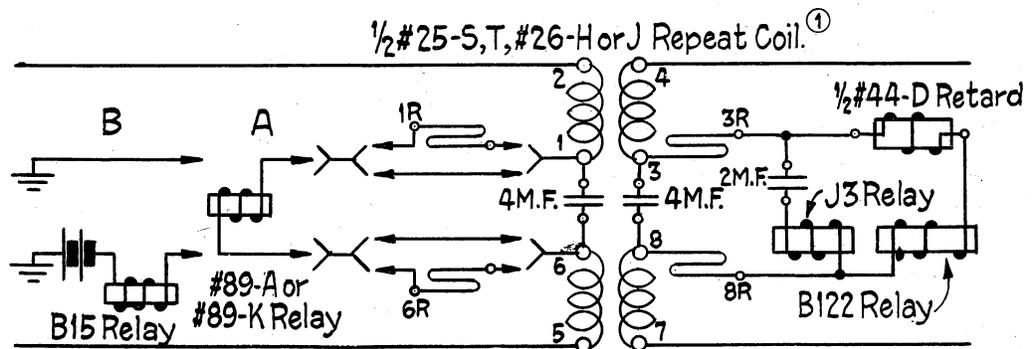
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9

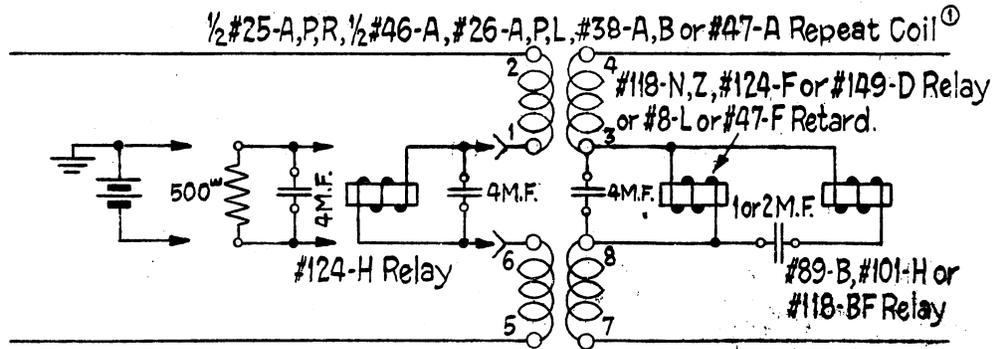
FIG. 2



Con- ditions	Repeat Coil.	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
A	1/2 #25-S or 1/2 #25-T	Ave.	.6	.5	.7	.4	.4	.7
		Lim.			1.0			.9
B	1/2 #25-T	Ave.	.6	.6	.8	.4	.4	.7
		Lim.			1.0			.9

① 1/2 #25-S = #26-H 1/2 #25-T = #26-J

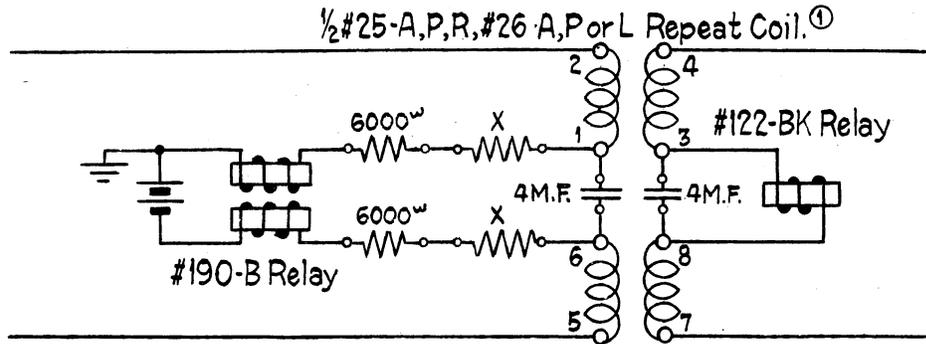
TRANSMISSION CIRCUITS AND LOSSES



Repeat Coil		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
½ #25-A	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9
½ #25-P	Ave.	2.6	2.6	2.9	2.6	2.6	2.9
	Lim.			3.5			3.2
½ #25-R	Ave.	1.1	1.0	1.2	1.0	1.0	1.2
	Lim.			1.5			1.5
#38-A	Ave.						
	Lim.						
#38-B	Ave.						
	Lim.						
½ #46-A	Ave.	.4	.4	.7	.4	.4	.7
	Lim.			1.0			.9

^① ½ #25-A = #26-A ½ #25-P = #26-P ½ #25-R = #26-L

TRANSMISSION CIRCUITS AND LOSSES

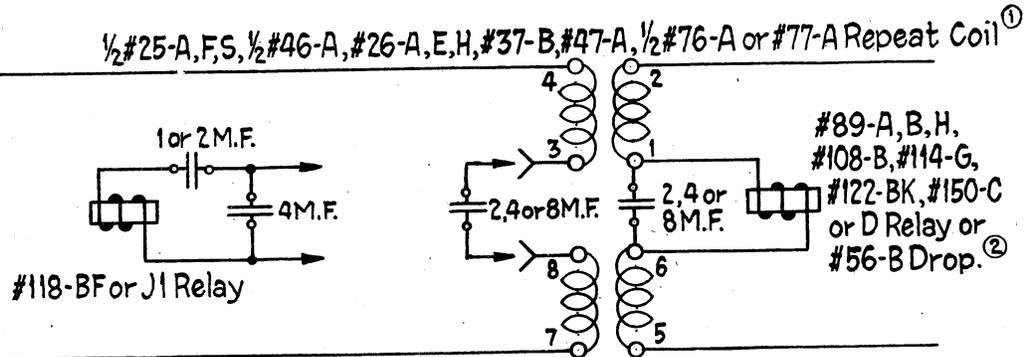


Repeat Coil		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
$\frac{1}{2}$ #25-A	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9
$\frac{1}{2}$ #25-P	Ave.	2.6	2.6	2.9	2.6	2.6	2.9
	Lim.			3.5			3.2
$\frac{1}{2}$ #25-R	Ave.	1.1	1.0	1.2	1.0	1.0	1.2
	Lim.			1.5			1.5

① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-P=#26-P $\frac{1}{2}$ #25-R=#26-L

NOTE:- X plus trunk and #190-B relay no less than 2000Ω.

TRANSMISSION CIRCUITS AND LOSSES

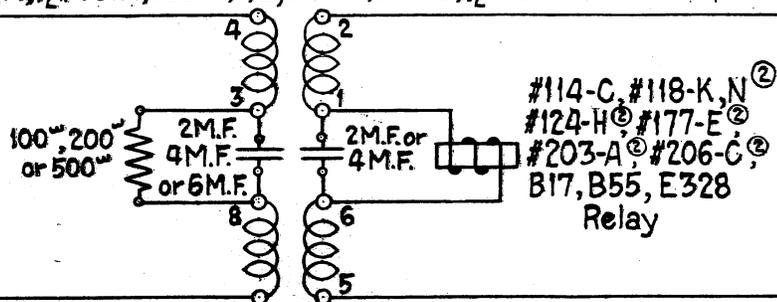


Repeat Coil	800~			1000~			
	2200	1300	600	1800	1200	600	
	H	M	L	H	M	L	
$\frac{1}{2}\#25-A$ (#89-B Relay)	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9
$\frac{1}{2}\#25-A$ (#108-B Relay)	Ave.	.7	.7	1.0	.5	.5	.9
	Lim.			1.5			1.1
$\frac{1}{2}\#25-F$	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9
$\frac{1}{2}\#25-S$	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9
#37-B	Ave.						
	Lim.						
$\frac{1}{2}\#46-A$	Ave.	.4	.4	.7	.4	.4	.7
	Lim.			1.0			.9

① $\frac{1}{2}\#25-A = \#26-A$ $\frac{1}{2}\#25-F = \#26-E$ $\frac{1}{2}\#25-S = \#26-H$ $\frac{1}{2}\#46-A = \#47-A = \frac{1}{2}\#76-A = \#77-A$
 ② #89-A, H, #114-G, #122-BK, #150-C, D relays and #56-B drop cause the same loss in this circuit as the #89-B relay.

TRANSMISSION CIRCUITS AND LOSSES

$\frac{1}{2}$ #25-A,K,L,P,R, $\frac{1}{2}$ #46-A,#26-A,P,L,#47-A,#38-B, $\frac{1}{2}$ #76-A or #77-A Repeat Coil.^①



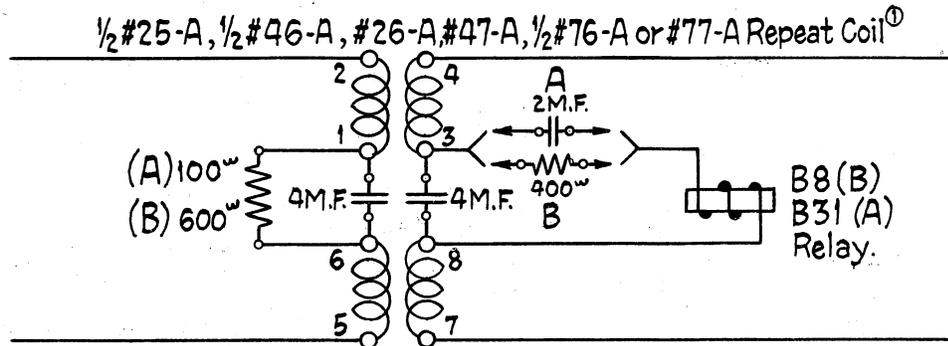
Repeat Coil	Relay and Resistance		800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
$\frac{1}{2}$ #25-A	E328 200 ^W	Ave.	.7	.6	.9	.5	.5	.8
		Lim.			1.5			1.0
	#114-C 500 ^W	Ave.	.6	.6	.8	.4	.4	.7
		Lim.			1.0			.9
	B17 (4M.F.) 500 ^W (4or6M.F.)	Ave.	.6	.5	.7	.4	.4	.7
		Lim.			1.0			.9
B17(2M.F.) 500 ^W (2M.F.)	Ave.	.6	.6	.8	.4	.4	.8	
	Lim.			1.0			1.0	
$\frac{1}{2}$ #25-P	B17 (4M.F.) 500 ^W (4or6M.F.)	Ave.	2.6	2.6	2.9	2.6	2.6	2.9
		Lim.			3.5			3.2
$\frac{1}{2}$ #25-R	B17(4M.F.) 500 ^W (4or6M.F.)	Ave.	1.1	1.0	1.2	1.0	1.0	1.2
		Lim.			1.5			1.5
	B17(2M.F.) 500 ^W (2M.F.)	Ave.	1.1	1.1	1.3	1.0	1.0	1.3
		Lim.			2.0			1.6
#38-B	#118-N 500 ^W	Ave.						
		Lim.						
$\frac{1}{2}$ #46-A	B17 (4M.F.) 500 ^W (4or6M.F.)	Ave.	.4	.4	.7	.4	.4	.7
		Lim.			1.0			.9
	B17(2M.F.) 500 ^W (2M.F.)	Ave.	.4	.5	.8	.4	.4	.8
		Lim.			1.0			1.0
	B55 100 ^W	Ave.	.4	.5	.8	.4	.4	.8
		Lim.			1.0			1.0

① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-P=#25-K=#26-P $\frac{1}{2}$ #25-R=#25-L=#26-L $\frac{1}{2}$ #46-A=#47-A= $\frac{1}{2}$ #76-A=#77-A

② #118-K,N,#124-H,#177-E,#203-A and #206-C cause the same loss in this circuit as the B17 relay.

TRANSMISSION CIRCUITS AND LOSSES

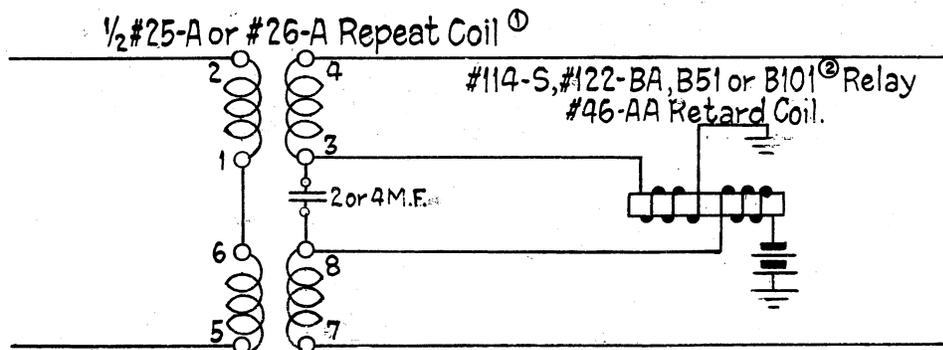
FIG. 1



Conditions and Repeat Coil.	800~			1000~			
	2200	1300	600	1800	1200	600	
	H	M	L	H	M	L	
A $\frac{1}{2}$ #46-A	Ave.	.4	.5	.8	.4	.4	.8
	Lim.			1.0			1.0
B $\frac{1}{2}$ #25-A	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9

① $\frac{1}{2}$ #25-A = #26-A $\frac{1}{2}$ #46-A = #47-A $\frac{1}{2}$ #76-A = #77-A

FIG. 2



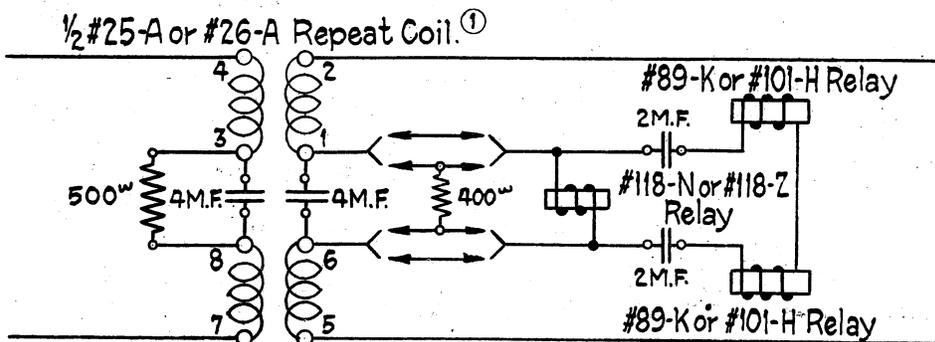
Relay or Retard Coil	800~			1000~			
	2200	1300	600	1800	1200	600	
	H	M	L	H	M	L	
#114-S	Ave.	.6	.6	.8	.4	.4	.7
	Lim.			1.0			.9
#122-BA	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9
B51	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9

① $\frac{1}{2}$ #25-A = #26-A

② B101 causes the same loss in this circuit as the B51 relay.

TRANSMISSION CIRCUITS AND LOSSES

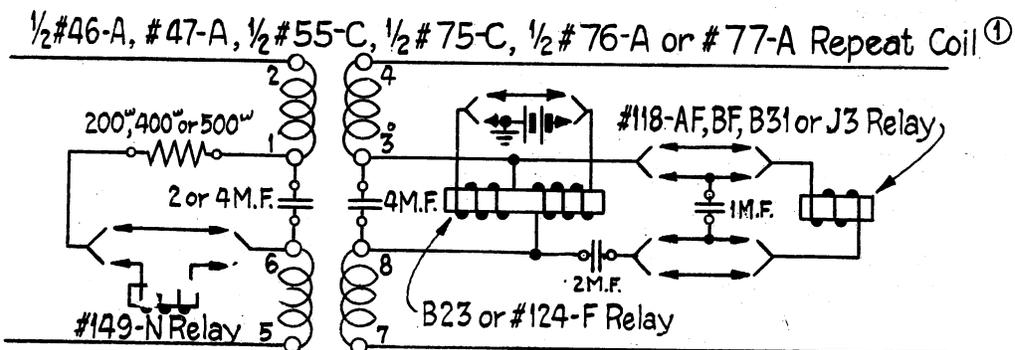
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			1.0

① $\frac{1}{2}$ #25-A = #26-A

FIG. 2

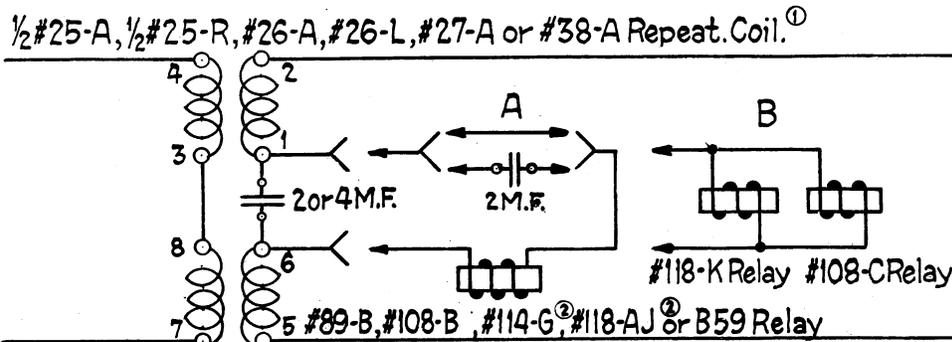


Condition	Repeat Coil	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
400 ^w or 500 ^w (4M.F.) or 200 ^w (2M.F.)	$\frac{1}{2}$ #46-A	Ave.	.4	.4	.7	.4	.4	.7
		Lim.			1.0			.9
	$\frac{1}{2}$ #55-C	Ave.	.5	.5	.8	.5	.5	.8
		Lim.			1.0			1.0
200 ^w (4M.F.)	Ave.							
	Lim.							

① $\frac{1}{2}$ #46-A = #47-A = $\frac{1}{2}$ #76-A = #77-A

$\frac{1}{2}$ #75-C = $\frac{1}{2}$ #55-G

TRANSMISSION CIRCUITS AND LOSSES



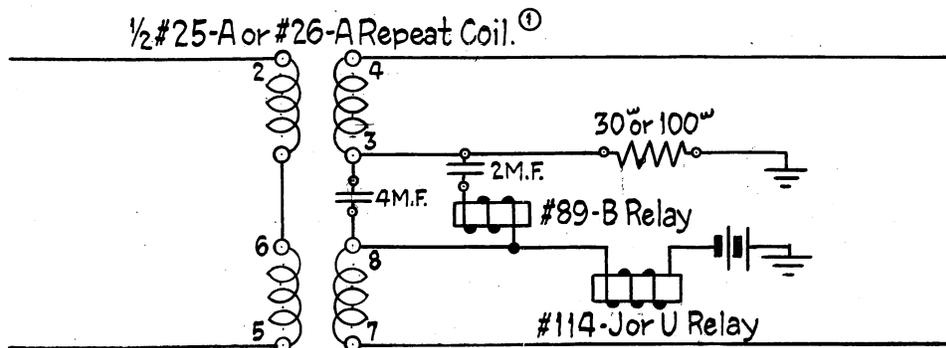
Con- ditions	Repeat Coil	Relay	800~			1000~			
			2200	1300	600	1800	1200	600	
			H	M	L	H	M	L	
A	$\frac{1}{2}$ #25-A	#89-B	Ave.	.6	.5	.7	.4	.4	.7
			Lim.			1.0			.9
		B59 (2M.F.)	Ave.	.7	.7	1.0	.6	.7	1.1
			Lim.			1.5			1.4
		B59 (4M.F.)	Ave.	.6	.6	.9	.4	.5	.9
			Lim.			1.5			1.1
	#108-B (2M.F.)	Ave.	.7	.7	1.0	.5	.5	.9	
		Lim.			1.5			1.1	
	$\frac{1}{2}$ #25-R	B59 (2M.F.)	Ave.	1.2	1.2	1.6	1.2	1.3	1.7
			Lim.			2.0			2.0
B59 (4M.F.)		Ave.	1.1	1.1	1.4	1.0	1.1	1.4	
		Lim.			2.0			1.7	
#38-A	#114-G	Ave.							
		Lim.							
B	$\frac{1}{2}$ #25-A	Ave.	.6	.5	.7	.4	.4	.7	
		Lim.			1.0			.9	

① $\frac{1}{2}$ #25-A = #26-A = #27-A

② #114-G and #118-AJ relays cause the same loss in this circuit as #89-B relay.

TRANSMISSION CIRCUITS AND LOSSES

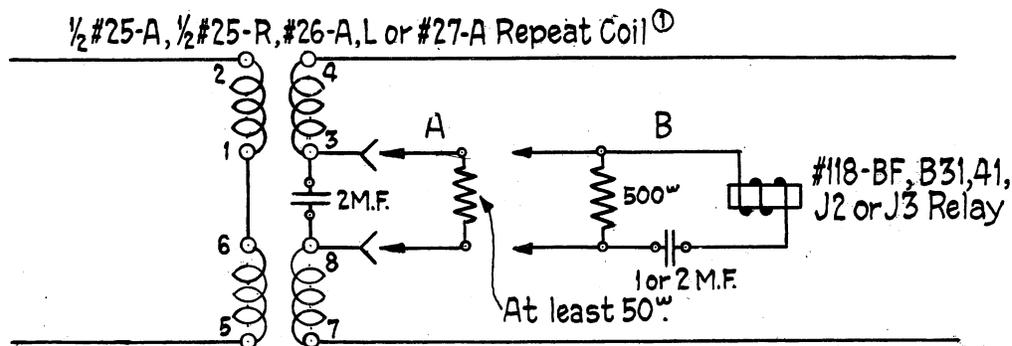
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9

^① $\frac{1}{2}$ #25-A = #26-A

FIG. 2

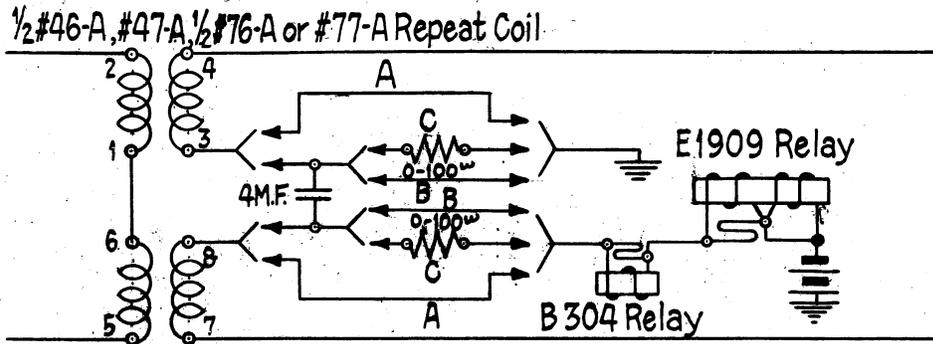


Con- ditions	Repeat Coil	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
A	$\frac{1}{2}$ #25-A	Ave.	.7	.7	.9	.5	.5	.9
		Lim.			1.5			1.2
	$\frac{1}{2}$ #25-R	Ave.	1.2	1.2	1.5	1.1	1.1	1.5
		Lim.			2.0			1.8
B	$\frac{1}{2}$ #25-A	Ave.	.6	.6	.8	.4	.4	.8
		Lim.			1.0			1.0

^① $\frac{1}{2}$ #25-A = #26-A = #27-A $\frac{1}{2}$ #25-R = #26-L.

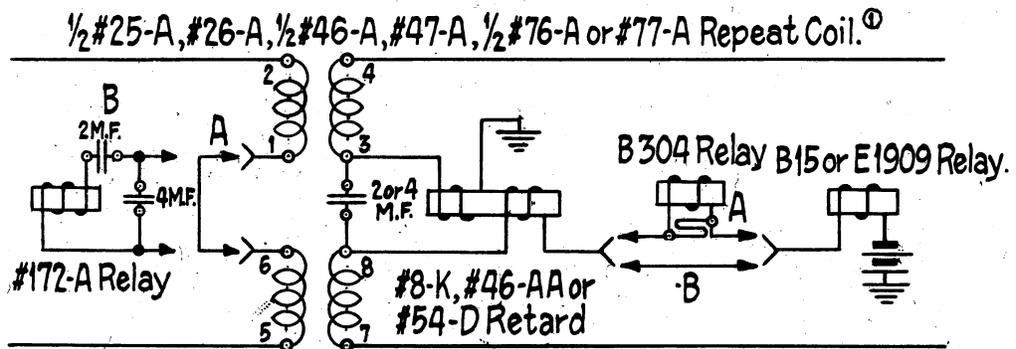
TRANSMISSION CIRCUITS AND LOSSES

FIG.1



Conditions		800~			1000		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
A	Ave.						
	Lim.						
B	Ave.						
	Lim.						
C	Ave.						
	Lim.						

FIG.2

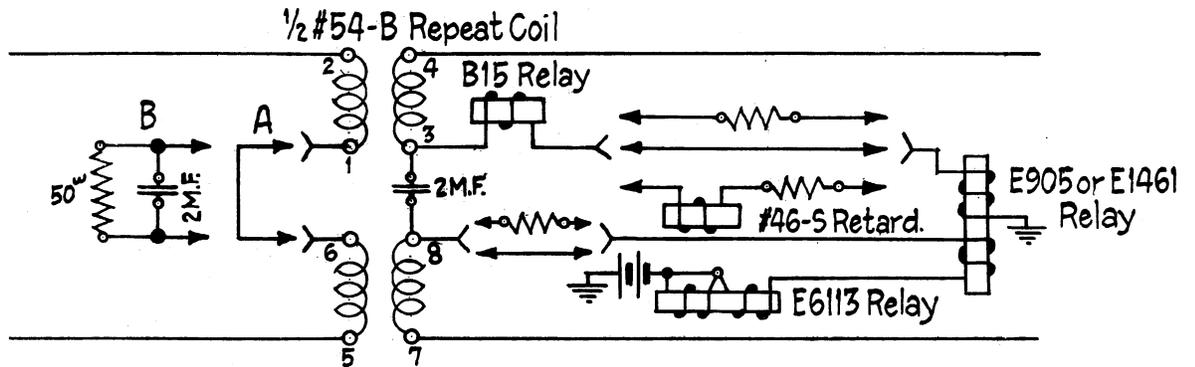


Condition		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
A	Ave.						
	$\frac{1}{2}$ #46-A Lim.						
B	Ave.	.6	.5	.7	.4	.4	.7
	$\frac{1}{2}$ #25-A Lim.			1.0			.9

^① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #46-A=#47-A= $\frac{1}{2}$ #76-A=#77-A.

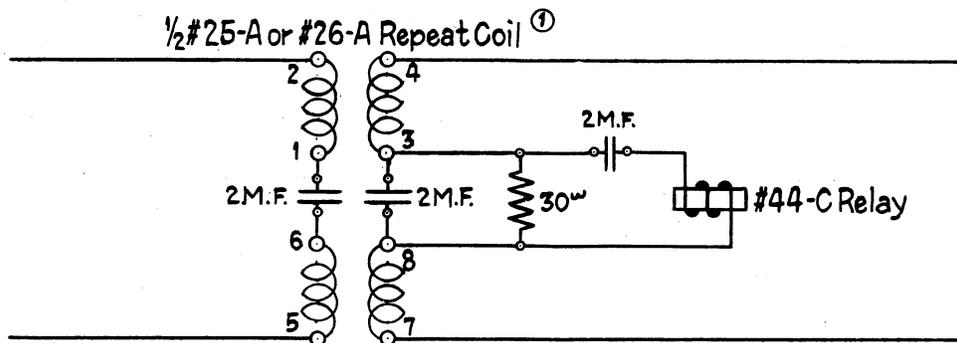
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

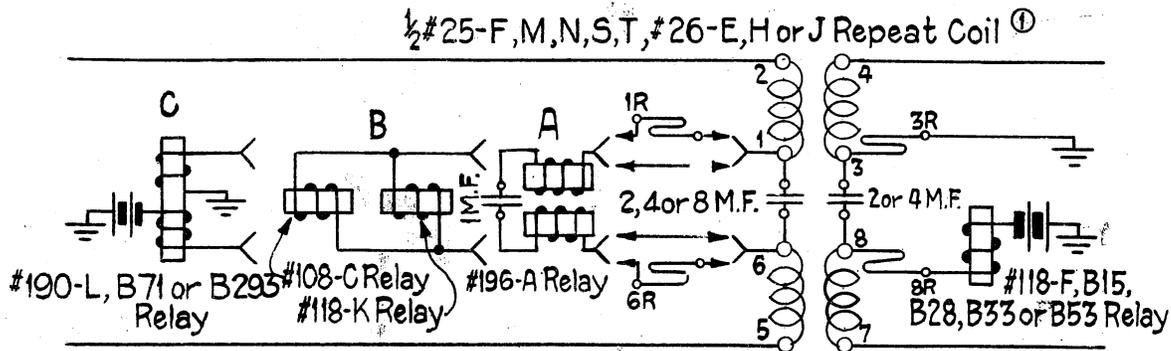
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.7	.6	.9	.5	.5	.9
	Lim.			1.5			1.1

^① 1/2 #25-A = #26-A

TRANSMISSION CIRCUITS AND LOSSES

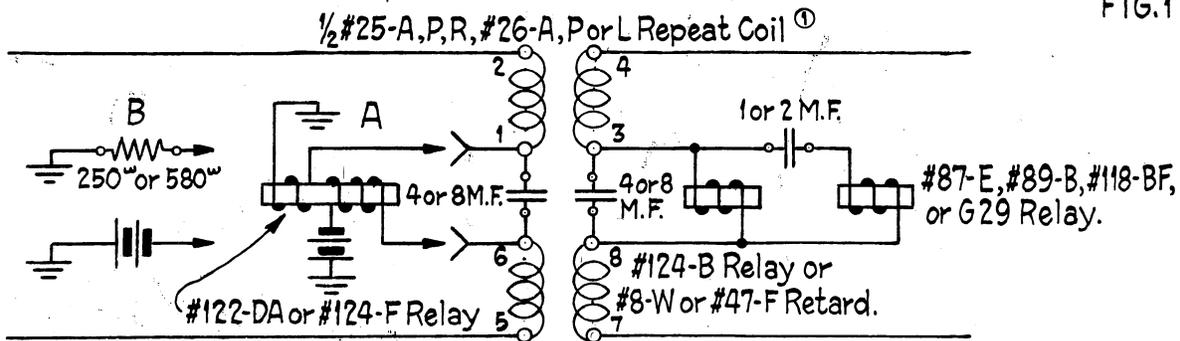


Con- ditions	Repeat Coil		800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
A	½#25-S	Ave	.6	.6	.8	.4	.4	.7
		Lim			1.0			.9
	½#25-T	Ave	.6	.6	.8	.4	.5	.8
		Lim			1.0			1.0
B	½#25-M 4 or 8 M.F.	Ave	1.2	1.2	1.6	1.1	1.1	1.4
		Lim			2.0			1.7
	½#25-S 4 or 8 M.F.	Ave	.7	.7	1.0	.5	.5	.9
		Lim			1.5			1.1
	½#25-M 2 M.F.	Ave.						
		Lim						
	½#25-S 2 M.F.	Ave.						
		Lim.						
C	½#25-M	Ave.	1.2	1.2	1.6	1.1	1.1	1.4
		Lim.			2.0			1.7
	½#25-N	Ave.	2.7	2.7	3.3	2.7	2.7	3.1
		Lim.			4.0			3.4
	½#25-S	Ave.	.7	.7	1.0	.5	.5	.9
		Lim.			1.5			1.1

① ½#25-S=#26-H=½#25-F=#26-E ½#25-T=#26-J.

TRANSMISSION CIRCUITS AND LOSSES

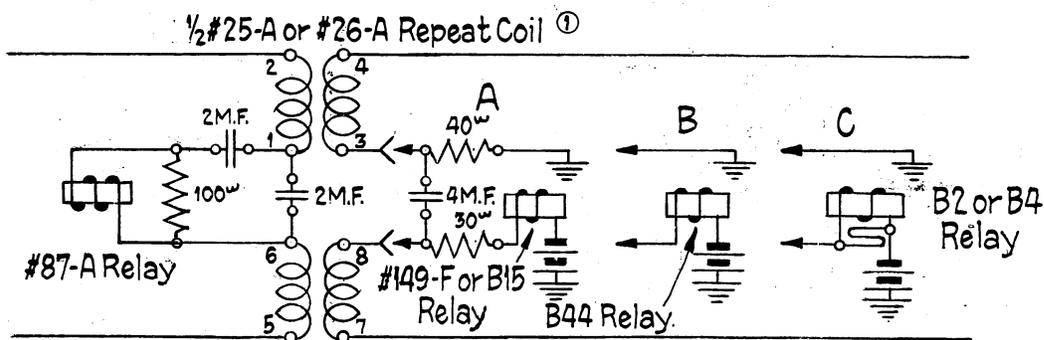
FIG. 1



Con- ditions	Repeat Coil	800~			1000~			
		2200	1300	600	1800	1200	600	
		H	M	L	H	M	L	
A	$\frac{1}{2}$ #25-A	Ave	.6	.5	.7	.4	.4	.7
		Lim			1.0			.9
	$\frac{1}{2}$ #25-P	Ave	2.6	2.6	2.9	2.6	2.6	2.9
		Lim			3.5			3.2
	$\frac{1}{2}$ #25-R	Ave	1.1	1.0	1.2	1.0	1.0	1.2
		Lim			1.5			1.5
B	$\frac{1}{2}$ #25-A	Ave	.6	.5	.7	.4	.4	.7
		Lim			1.0			.9

^① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-P=#26-P $\frac{1}{2}$ #25-R=#26-L

FIG. 2

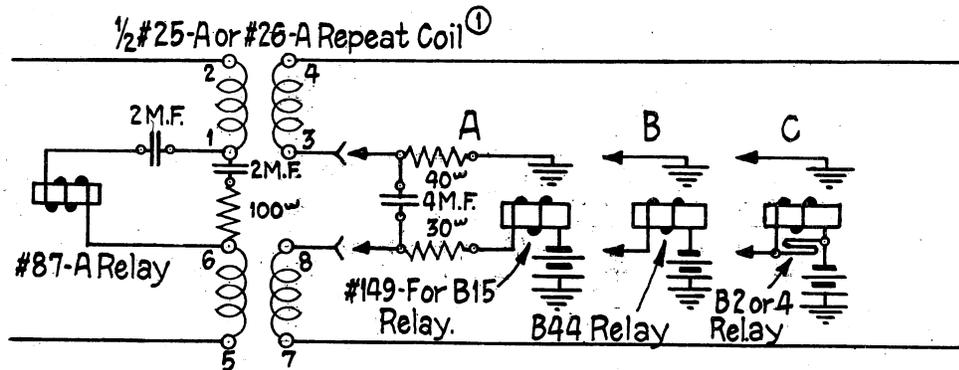


Conditions		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
A	Ave.	.7	.7	.9	.4	.5	.8
	Lim.			1.5			1.0
B	Ave.						
	Lim.						
C	Ave.						
	Lim.						

^① $\frac{1}{2}$ #25-A=#26-A

TRANSMISSION CIRCUITS AND LOSSES

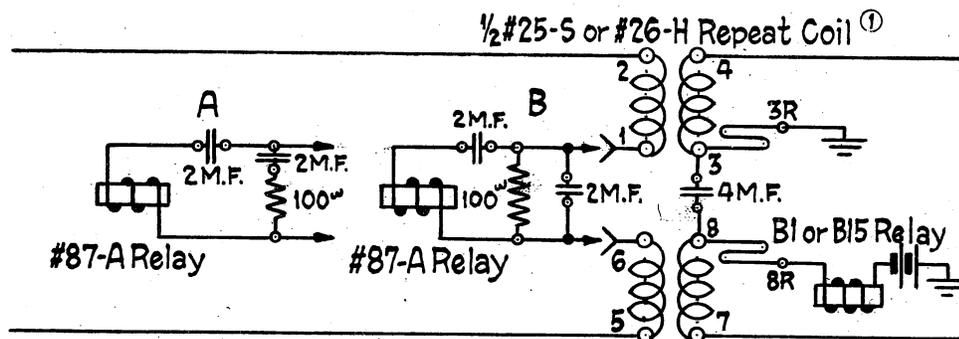
FIG.1



Conditions		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
A (#149-F)	Ave.						
	Lim.						
A (B15)	Ave.	.8	.9	1.4	.6	.8	1.3
	Lim.			2.0			1.6
B	Ave.						
	Lim.						
C	Ave.						
	Lim.						

① $\frac{1}{2}$ #25-A = #26-A

FIG.2

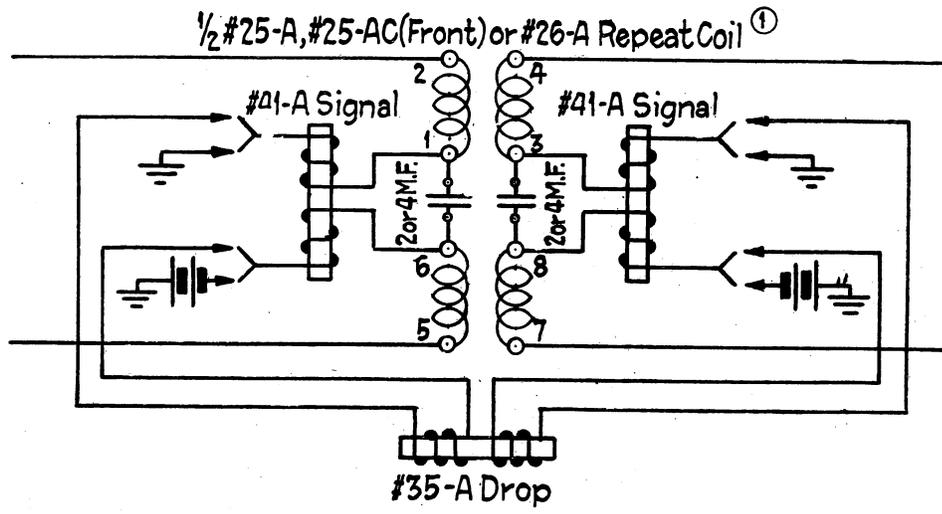


Con- ditions		Relay	800~			1000~		
			2200 H	1300 M	600 L	1800 H	1200 M	600 L
A	B1	Ave.	.8	.9	1.4	.6	.9	1.4
		Lim.			2.0			1.7
	B15	Ave.	.8	.9	1.4	.6	.8	1.3
		Lim.			2.0			1.6
B	B1	Ave.	.7	.7	.9	.5	.6	.9
		Lim.			1.5			1.1
	B15	Ave.	.7	.7	.9	.4	.5	.8
		Lim.			1.5			1.0

① $\frac{1}{2}$ #25-S = #26-H

TRANSMISSION CIRCUITS AND LOSSES

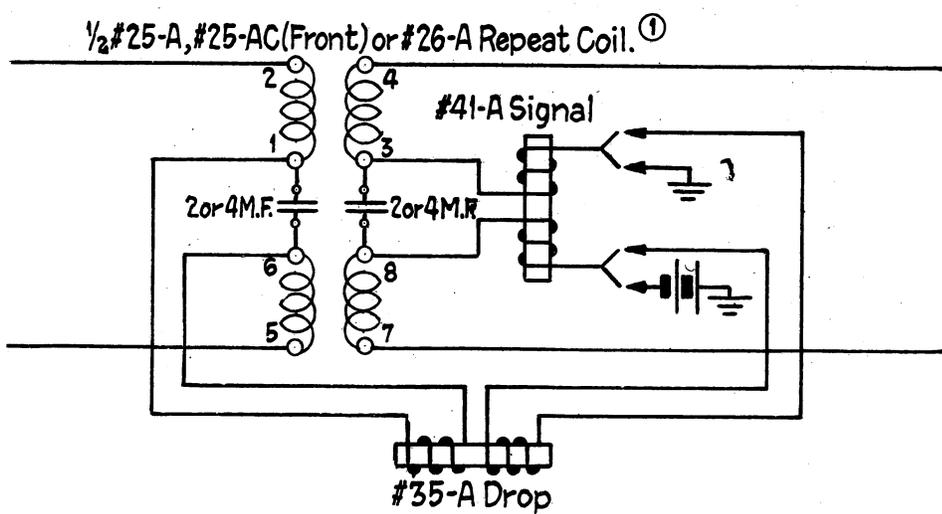
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9

① ½ #25-A = #26-A = #25-AC (Front)

FIG. 2

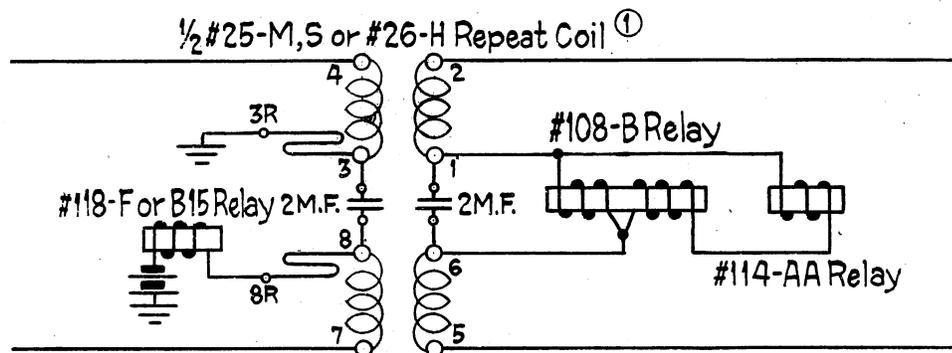


		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.0			.9

① ½ #25-A = #26-A = #25-AC (Front)

TRANSMISSION CIRCUITS AND LOSSES

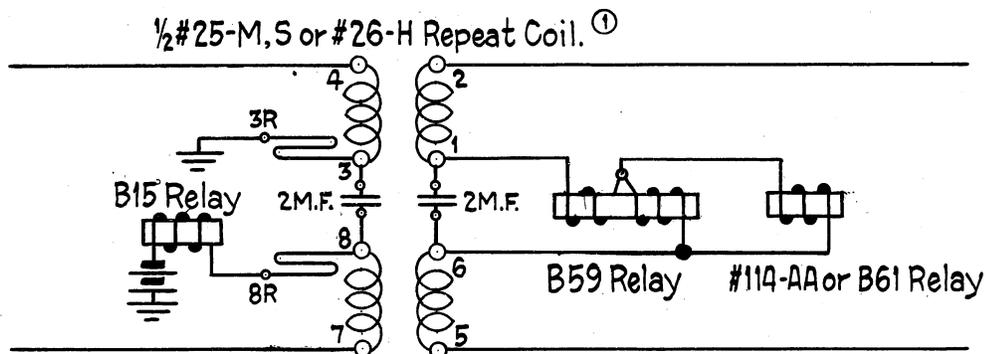
FIG. 1



Repeat Coil		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
½ #25-M	Ave.	1.2	1.2	1.6	1.1	1.1	1.4
	Lim.			2.0			1.7
½ #25-S	Ave.	.7	.7	1.0	.5	.5	.9
	Lim.			1.5			1.1

① ½ #25-S = #26-H

FIG. 2

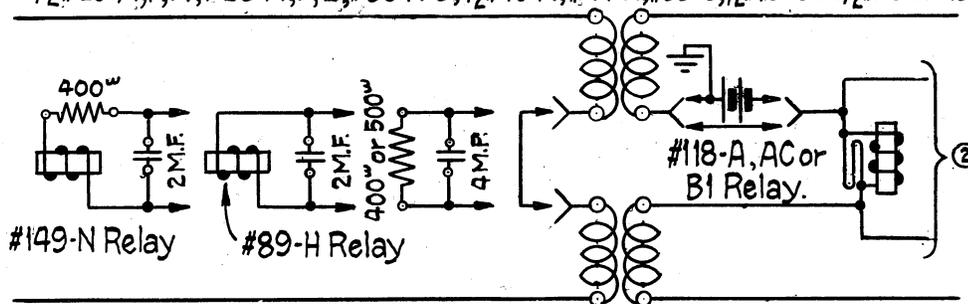


Relay		Repeat Coil		800~			1000~		
				2200	1300	600	1800	1200	600
				H	M	L	H	M	L
B61	½ #25-M	Ave.		1.3	1.4	2.0	1.3	1.4	1.9
		Lim.			2.5			2.2	
	½ #25-S	Ave.		.8	.9	1.4	.7	.8	1.3
		Lim.			2.0			1.6	
#114-AA	½ #25-M	Ave.							
		Lim.							
	½ #25-S	Ave.							
		Lim.							

① ½ #25-S = #26-H

TRANSMISSION CIRCUITS AND LOSSES

$\frac{1}{2}$ #25-A,P,R, #26-A,P,L, #38-A B, $\frac{1}{2}$ #46-A, #47-A, #55-C, $\frac{1}{2}$ #75-C or $\frac{1}{2}$ #76-A Repeat Coil.^①

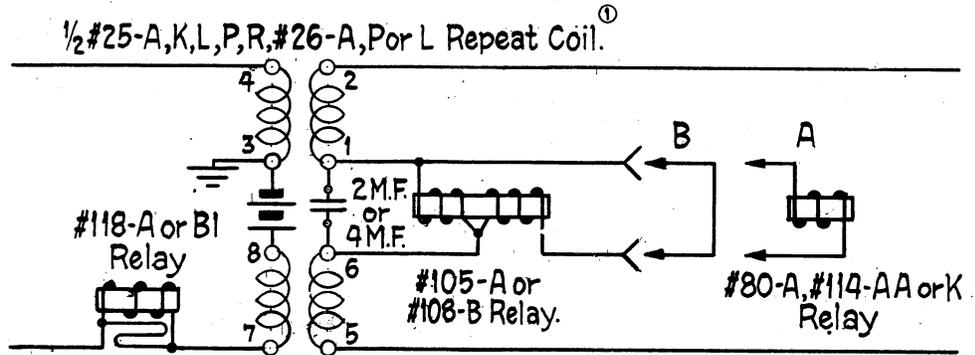


Repeat Coil		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
$\frac{1}{2}$ #25-A	Ave.	.7	.6	.9	.5	.5	.9
	Lim.			1.5			1.1
$\frac{1}{2}$ #25-P	Ave.	2.7	2.7	3.1	2.7	2.7	3.1
	Lim.			3.5			3.4
$\frac{1}{2}$ #25-R	Ave.	1.2	1.1	1.4	1.1	1.1	1.4
	Lim.			2.0			1.7
#38-A	Ave.						
	Lim.						
#38-B	Ave.						
	Lim.						
$\frac{1}{2}$ #46-A	Ave.	.5	.5	.9	.5	.5	.9
	Lim.			1.0			1.1
$\frac{1}{2}$ #75-C	Ave.						
	Lim.						
$\frac{1}{2}$ #76-A	Ave.						
	Lim.						

① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-P=#26-P $\frac{1}{2}$ #25-R=#26-L $\frac{1}{2}$ #46-A=#47-A. #55-C=#75-C

② Apparatus usually connected here has practically no effect on transmission loss.

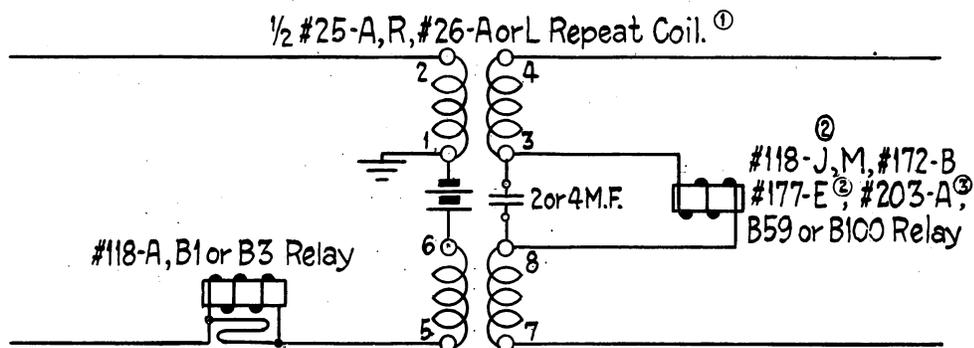
TRANSMISSION CIRCUITS AND LOSSES



Con- ditions	Repeat Coil		800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
A	$\frac{1}{2}$ #25-A	Ave.	.7	.6	.9	.5	.5	.9
		Lim.			1.5			1.1
	$\frac{1}{2}$ #25-P	Ave.	2.7	2.7	3.1	2.7	2.7	3.1
		Lim.			3.5			3.4
	$\frac{1}{2}$ #25-R	Ave.	1.2	1.1	1.4	1.1	1.1	1.4
		Lim.			2.0			1.7
B	$\frac{1}{2}$ #25-A (2M.F.)	Ave.	.8	.8	1.2	.6	.6	1.0
		Lim.			1.5			1.3
	$\frac{1}{2}$ #25-A (4M.F.)	Ave.	.7	.7	.9	.5	.5	.9
		Lim.			1.5			1.1
	$\frac{1}{2}$ #25-P	Ave.	2.7	2.7	3.2	2.7	2.7	3.1
		Lim.			3.5			3.4
	$\frac{1}{2}$ #25-R (2M.F.)	Ave.	1.3	1.3	1.8	1.2	1.2	1.6
		Lim.			2.5			1.9
	$\frac{1}{2}$ #25-R (4M.F.)	Ave.	1.2	1.2	1.5	1.1	1.1	1.4
		Lim.			2.0			1.7

① $\frac{1}{2}$ #25-A = #26-A $\frac{1}{2}$ #25-P = #26-P $\frac{1}{2}$ #25-R = #26-L #25-K = #25-P #25-L = #25-R

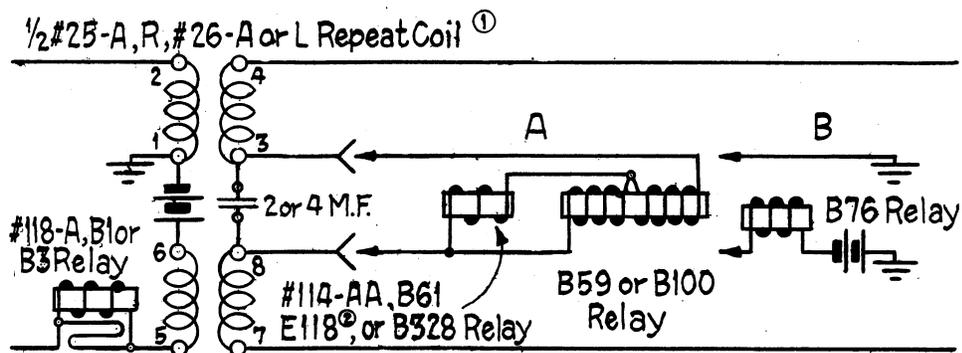
TRANSMISSION CIRCUITS AND LOSSES



Repeat Coil.	Supv. Relay	Relay and Condenser.		800~			1000~		
				2200	1300	600	1800	1200	600.
				H	M	L	H	M	L
½ #25-A	#118-A	#118-M (2M.F.)	Ave.	.7	.6	.9	.5	.5	.9
			Lim.			1.5			1.1
	B1	#172-B (2 or 4M.F.)	Ave.	.7	.6	.9	.5	.5	.9
			Lim.			1.5			1.1
		B59 (2M.F.)	Ave.	.8	.8	1.2	.7	.8	1.3
			Lim.			1.5			1.6
	B59 (4M.F.)	Ave.	.7	.7	1.0	.5	.6	1.0	
		Lim.			1.5			1.3	
B3	B100 (2M.F.)	Ave.	.8	.8	1.2	.7	.8	1.3	
		Lim.			1.5			1.6	
½ #25-R	B1	#203-A (2 or 4M.F.)	Ave.	1.2	1.1	1.4	1.1	1.1	1.4
			Lim.			2.0			1.7
		B59 (2M.F.)	Ave.	1.3	1.3	1.8	1.3	1.4	1.9
			Lim.			2.5			2.2
		B59 (4M.F.)	Ave.	1.2	1.2	1.6	1.1	1.2	1.6
			Lim.			2.0			1.9

- ① ½ #25-A = #26-A ½ #25-R = #26-L
 ② #118-J and #177-E cause the same loss in this circuit as #118-M Relay.
 ③ #203-A causes the same loss in this circuit as #172-B Relay.

TRANSMISSION CIRCUITS AND LOSSES

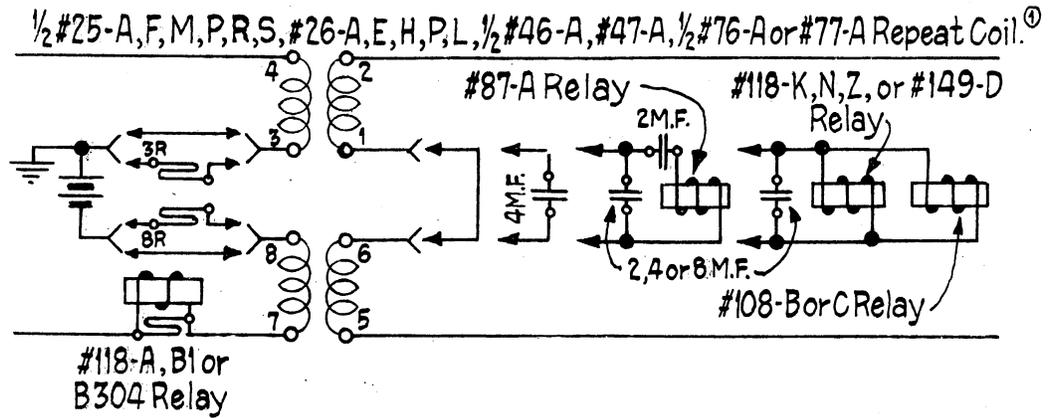


Con- ditions	Repeat Coil	Relay and Condenser		800~			1000~		
				2200	1300	600	1800	1200	600
				H	M	L	H	M	L
A	$\frac{1}{2}$ #25-A	B59 and B61(2M.F.)	Ave.	.8	.8	1.2	.6	.6	1.0
			Lim.			1.5			1.3
		B59 and B61(4M.F.)	Ave.	.7	.7	.9	.5	.5	.9
			Lim.			1.5			1.1
		B100 and #114-AA(2or4 M.F.)	Ave.	.7	.6	.9	.5	.5	.9
			Lim.			1.5			1.1
	$\frac{1}{2}$ #25-R	B59 and B61(2M.F.)	Ave.	1.3	1.3	1.8	1.2	1.2	1.6
			Lim.			2.5			1.9
		B59 and B61(4M.F.)	Ave.	1.2	1.2	1.5	1.1	1.1	1.4
			Lim.			2.0			1.7
B100 and E118(2or4 M.F.)	Ave.	1.2	1.1	1.4	1.1	1.1	1.4		
	Lim.			2.0			1.7		
B100 and B328(2M.F.)	Ave.								
	Lim.								
B	$\frac{1}{2}$ #25-A	B76 (2M.F.)	Ave.	.7	.7	1.0	.5	.6	.9
			Lim.			2.5			2.0

① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-R=#26-L

② E118 causes the same loss in this circuit as #114-AA relay.

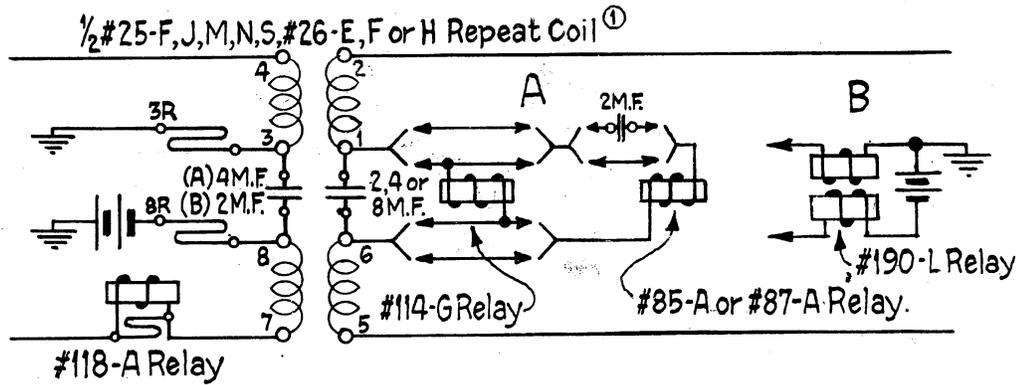
TRANSMISSION CIRCUITS AND LOSSES



Repeat Coil		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
$\frac{1}{2}$ #25-A	Ave.	.7	.6	.9	.5	.5	.9
	Lim.			1.5			1.1
$\frac{1}{2}$ #25-M	Ave						
	Lim						
$\frac{1}{2}$ #25-P	Ave	2.7	2.7	3.1	2.7	2.7	3.1
	Lim			3.5			3.4
$\frac{1}{2}$ #25-R	Ave	1.2	1.1	1.4	1.1	1.1	1.4
	Lim			2.0			1.7
$\frac{1}{2}$ #25-S	Ave						
	Lim						
$\frac{1}{2}$ #46-A	Ave	.5	.5	.9	.5	.5	.9
	Lim			1.0			1.1

^① $\frac{1}{2}$ #25-A=#26-A $\frac{1}{2}$ #25-P=#26-P $\frac{1}{2}$ #25-R=#26-L $\frac{1}{2}$ #25-S=#26-H $\frac{1}{2}$ #25-F=#26-E
 $\frac{1}{2}$ #46-A=#47-A = $\frac{1}{2}$ #76-A = #77-A.

TRANSMISSION CIRCUITS AND LOSSES

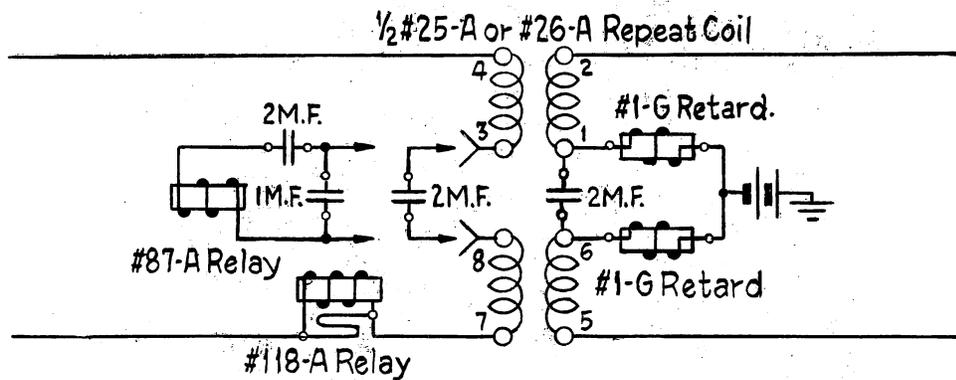


Condition	Repeat Coil		800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
A	½#25-F	Ave.	.7	.7	.9	.5	.6	.9
		Lim.			1.5			1.2
	½#25-J	Ave.	2.7	2.7	3.2	2.7	2.7	3.2
		Lim.			3.5			3.5
	½#25-M	Ave.	1.2	1.2	1.5	1.1	1.2	1.5
		Lim.			2.0			1.8
	½#25-N	Ave.	2.7	2.7	3.2	2.7	2.7	3.2
		Lim.			3.5			3.5
	½#25-S	Ave.	.7	.7	.9	.5	.6	.9
		Lim.			1.5			1.2
	#26-F	Ave.	.7	.7	.9	.5	.6	.9
		Lim.			1.5			1.2
B	#25-M	Ave						
		Lim						
	#25-N	Ave						
		Lim						
	#25-S	Ave						
		Lim.						

① ½#25-F. 26-E ½#25-S=#26-H

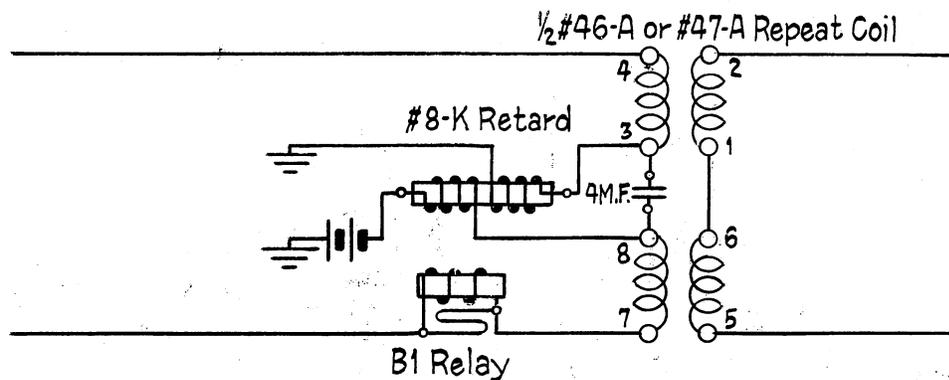
TRANSMISSION CIRCUITS AND LOSSES

FIG.1



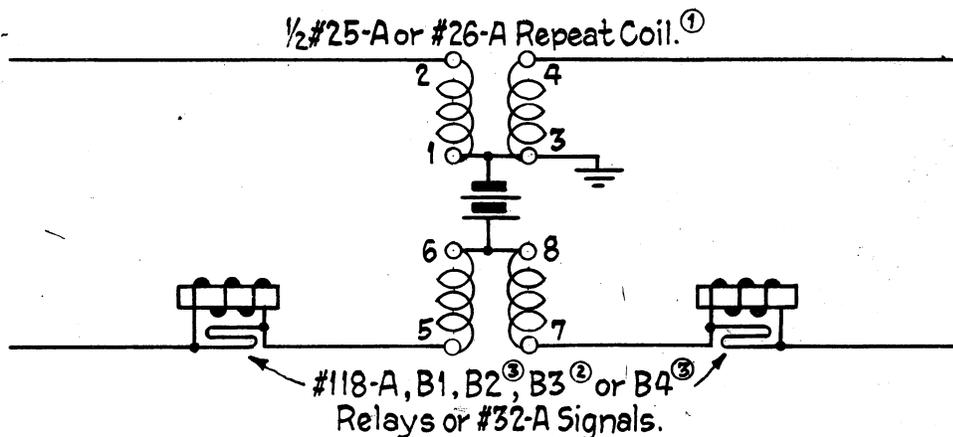
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.7	.6	.9	.5	.5	.9
	Lim.			1.5			1.1

FIG.2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.5	.5	.9	.5	.5	.9
	Lim.			1.5			1.1

TRANSMISSION CIRCUITS AND LOSSES



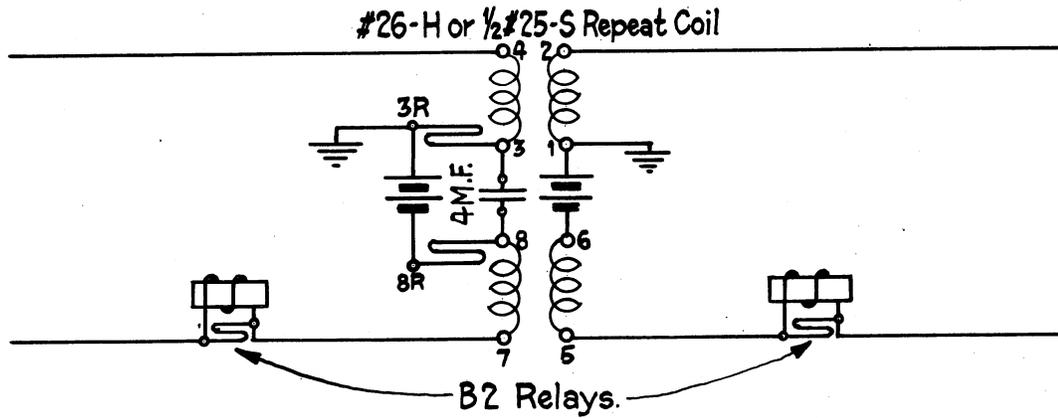
Relay or Signal.		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#118-A	Ave.	.8	.8	1.1	.6	.7	1.1
	Lim.			2.0			2.0
B1	Ave.	.7	.7	.9	.5	.6	.9
	Lim.			2.0			1.8
#32-A	Ave.	1.0	1.1	1.9	.9	1.1	1.8
	Lim.			3.0			2.7

① 1/2 #25-A = #26-A

② #118-A = B3

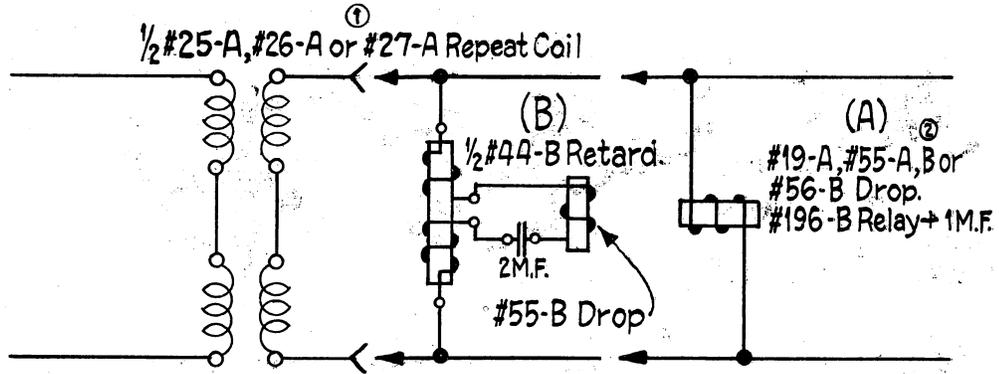
③ B1-B2-B4

TRANSMISSION CIRCUITS AND LOSSES



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.7	.8	1.0	.5	.7	1.0
	Lim.			2.5			2.1

TRANSMISSION CIRCUITS AND LOSSES

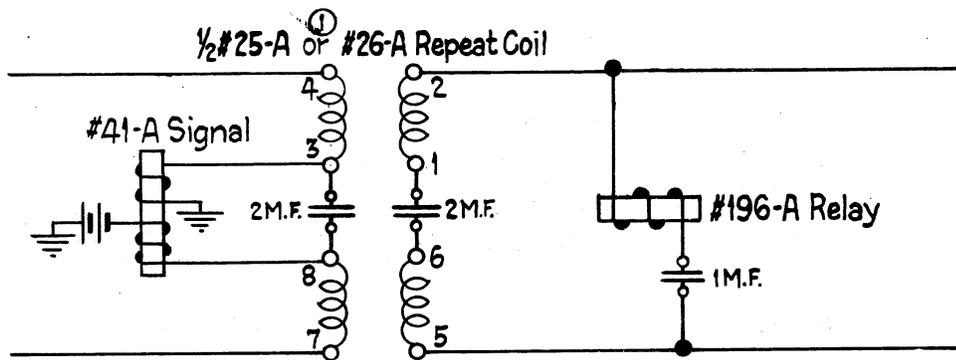


Condition.	Drop or Relay		800~			1000~		
			2200	1300	600	1800	1200	600
			H	M	L	H	M	L
(A)	#19-A	Ave.	2.2	1.5	1.1	1.6	1.2	1.0
		Lim.			1.5			1.5
	#55-A	Ave.	2.2	1.5	1.1	1.6	1.2	1.0
		Lim.			1.5			1.5
	#56-B	Ave.	1.7	1.2	1.0	1.4	1.1	1.0
		Lim.			1.5			1.4
	#196-B	Ave.	.6	.5	.7	.4	.4	.7
		Lim.			1.0			.9
(B)	Ave.							
	Lim.							

① $\frac{1}{2}$ #25-A = #26-A = #27-A.
 ② #55-B = #56-B

TRANSMISSION CIRCUITS AND LOSSES

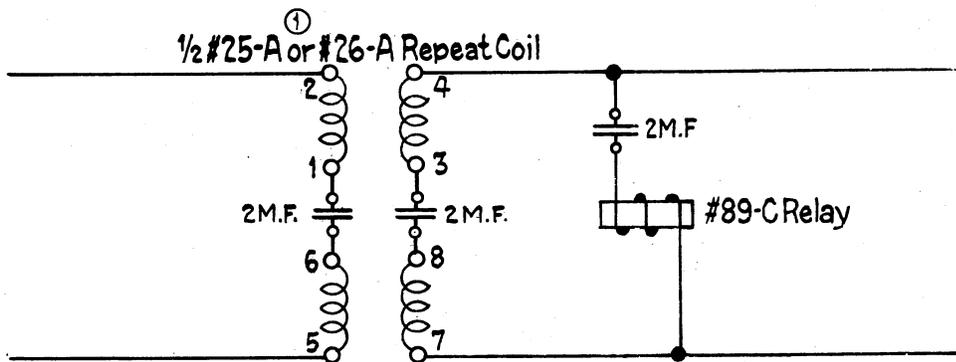
FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.6	.5	.7	.4	.4	.7
	Lim			1.0			.9

① 1/2 #25-A = #26-A

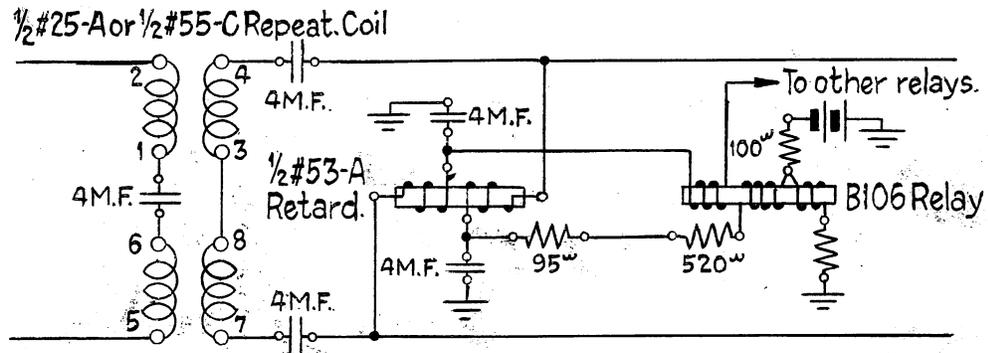
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.5	1.0	.9	1.1	.9	.9
	Lim.			1.5			1.2

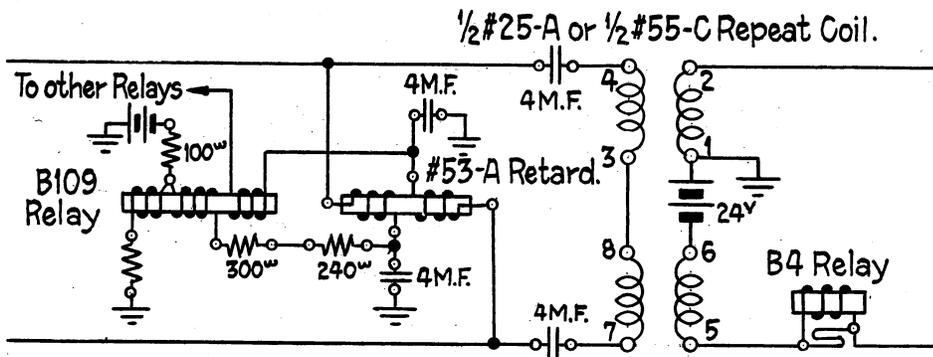
① 1/2 #25-A = #26-A.

TRANSMISSION CIRCUITS AND LOSSES



Repeat Coil		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
$\frac{1}{2}\#25-A$	Ave.	.6	.5	.7	.4	.4	.7
	Lim.			1.5			1.1
$\frac{1}{2}\#55-C$	Ave.	.5	.5	.8	.5	.5	.8
	Lim.			1.5			1.3

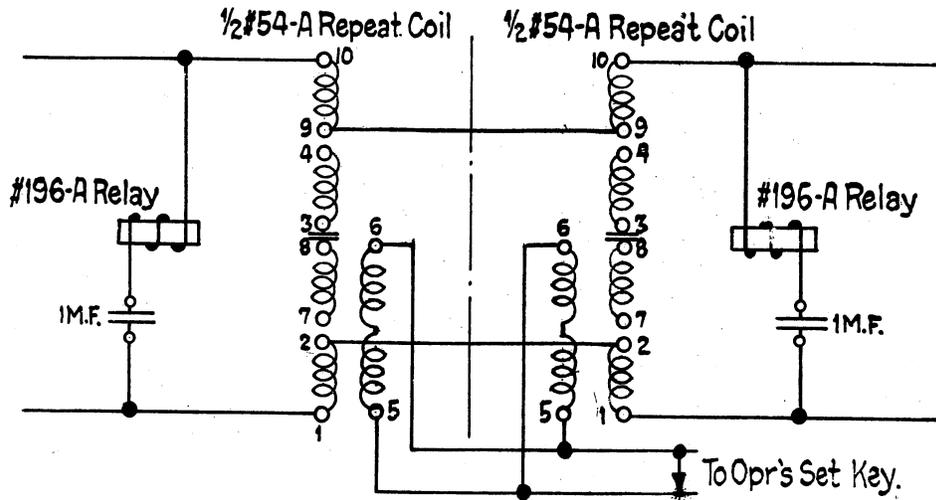
TRANSMISSION CIRCUITS AND LOSSES



Repeat Coil.		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
½ #25-A	Ave.	.7	.6	.9	.5	.5	.9
	Lim.			1.5			1.3
½ #55-C	Ave.	.6	.6	.9	.6	.6	.9
	Lim.			1.5			1.5

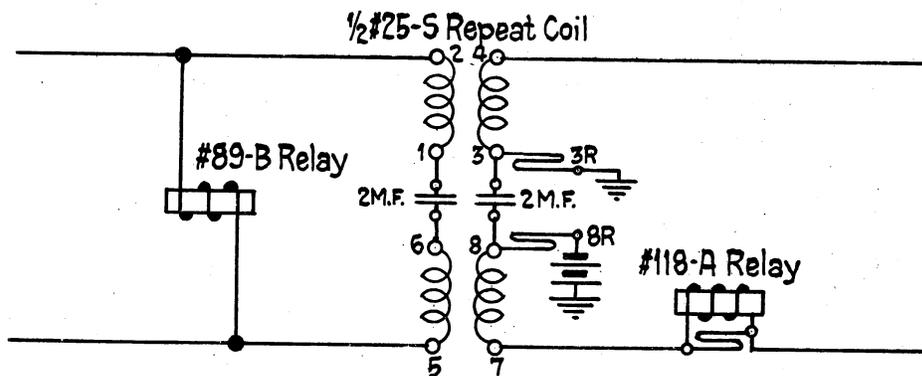
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave						
	Lim						

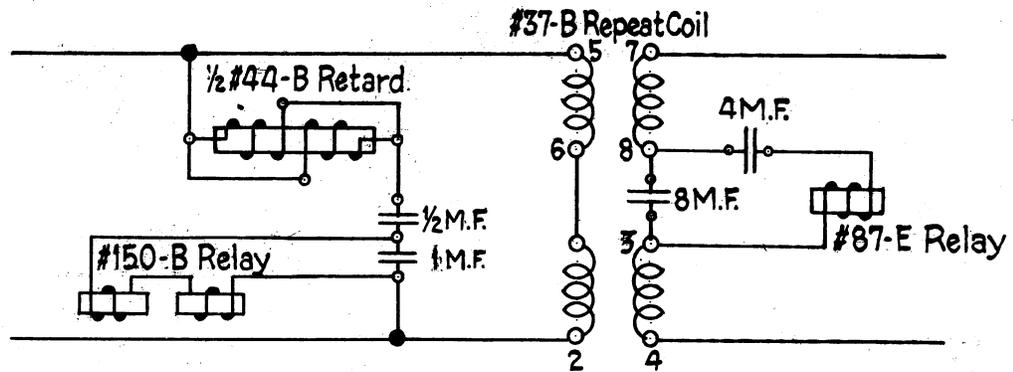
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.8	1.4	1.4	1.3	1.2	1.4
	Lim.			2.0			1.8

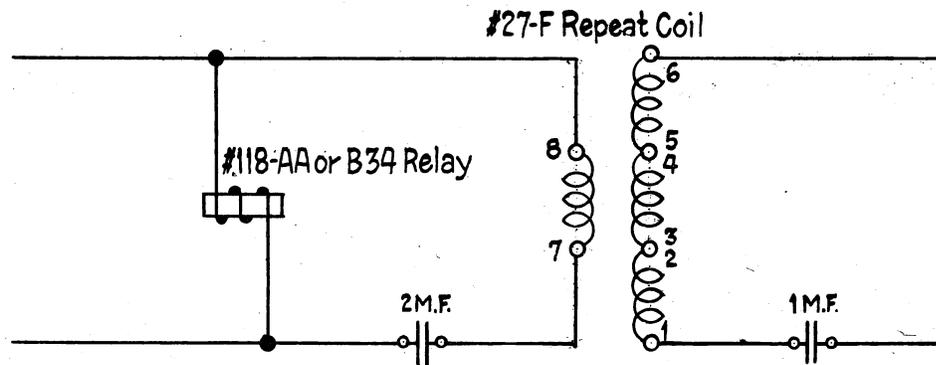
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.7	.4	.3	.4	.3	.3
	Lim.			1.0			.5

FIG. 2

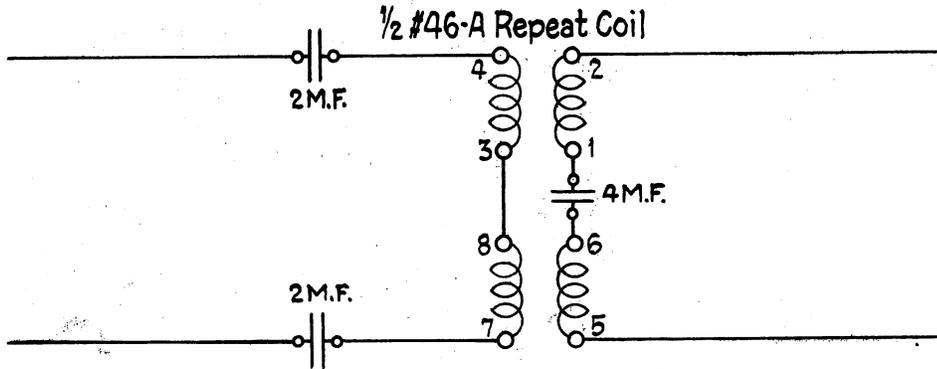


		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	9.3	9.3	9.6	9.4	9.4	9.7
	Lim.			12.0			12.0

#118-AA and B34 cause the same loss in this circuit

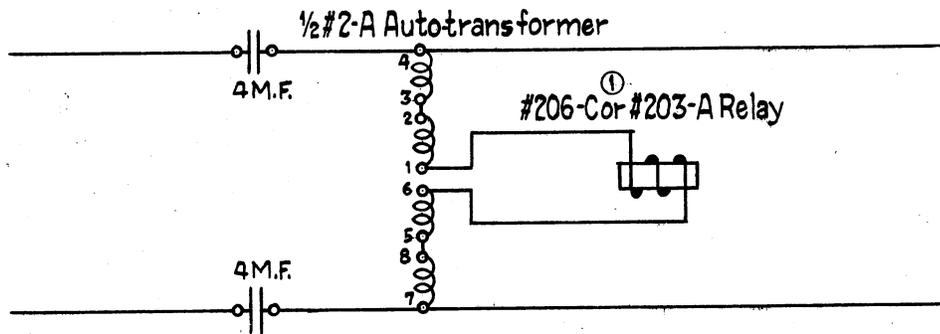
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.4	.4	.8	.4	.4	.8
	Lim.			1.0			1.0

FIG. 2

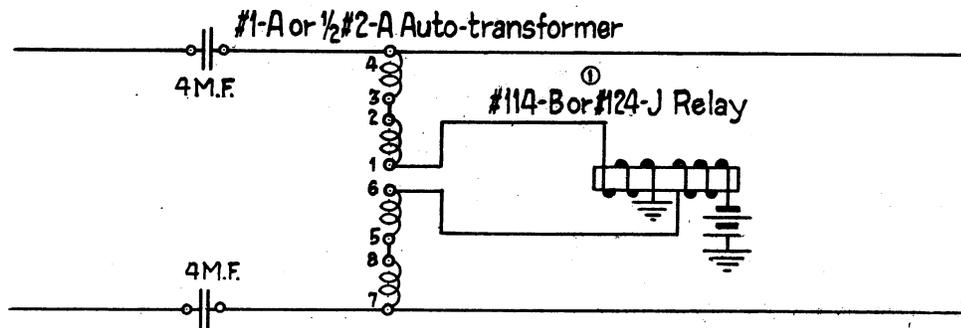


		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

① #206-C or #203-A relays in this circuit cause the same loss.

TRANSMISSION CIRCUITS AND LOSSES

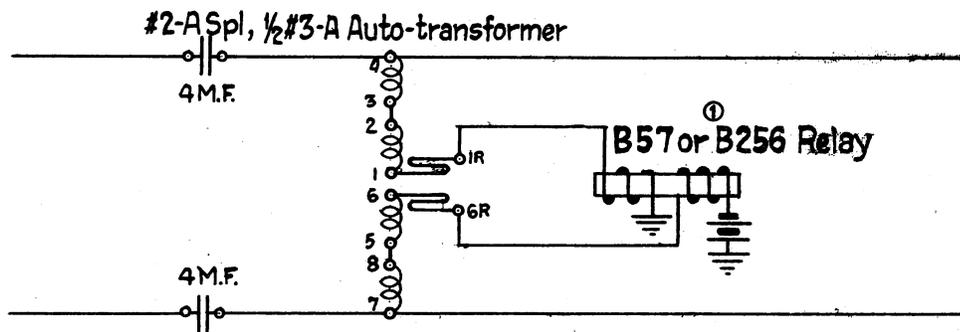
FIG. 1



Auto-trans		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#1-A	Ave.	.1	.1	0	.1	.1	.1
	Lim.			.5			.6
1/2 #2-A	Ave.	.1	.1	.1	.1	.1	.1
	Lim.			.5			.3

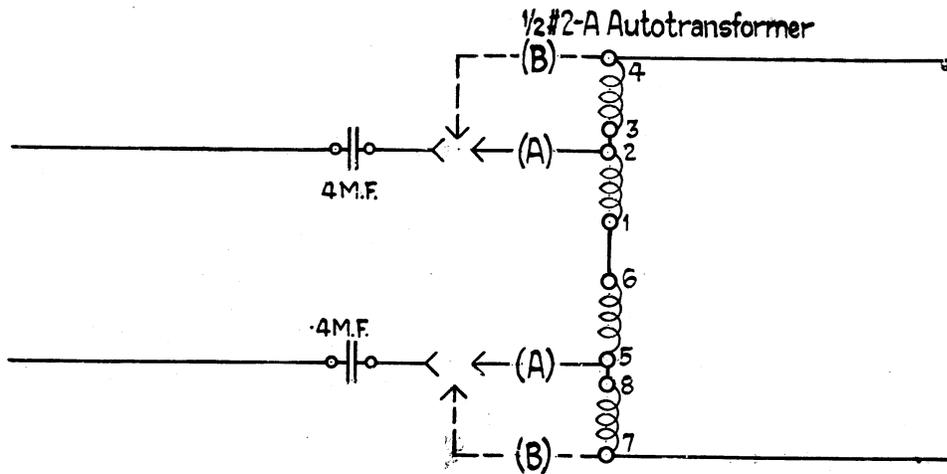
① #114-B or #124-J relays in this circuit cause the same loss.

FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.						
	Lim.						

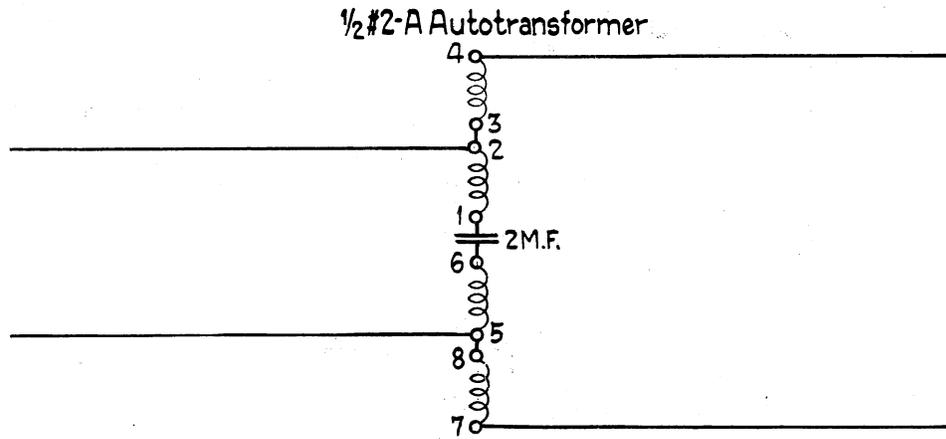
TRANSMISSION CIRCUITS AND LOSSES



Conditions		800~			1000~		
		2200 H	1300 M	600 L	1800 H	1200 M	600 L
(A)	Ave.	.5	.7	.8	.5	.7	.8
	Lim.			1.0			.9
(B)	Ave.	0	0	0	0	0	0
	Lim.			.5			.2

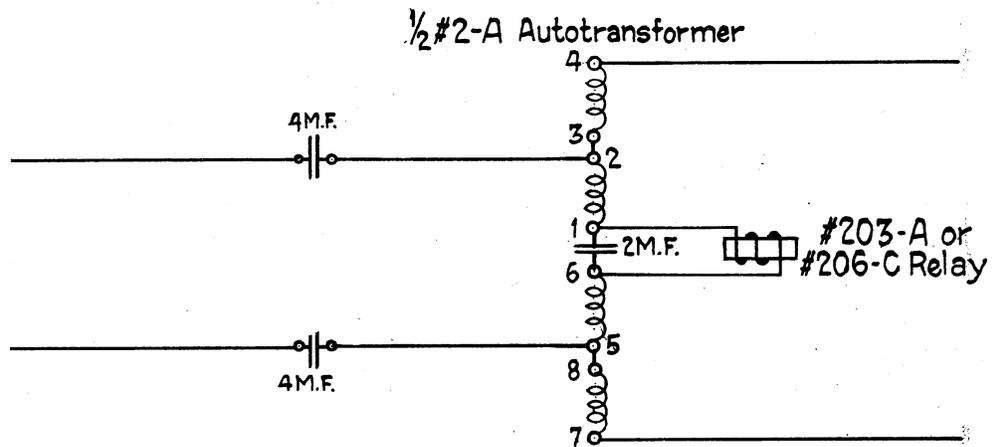
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



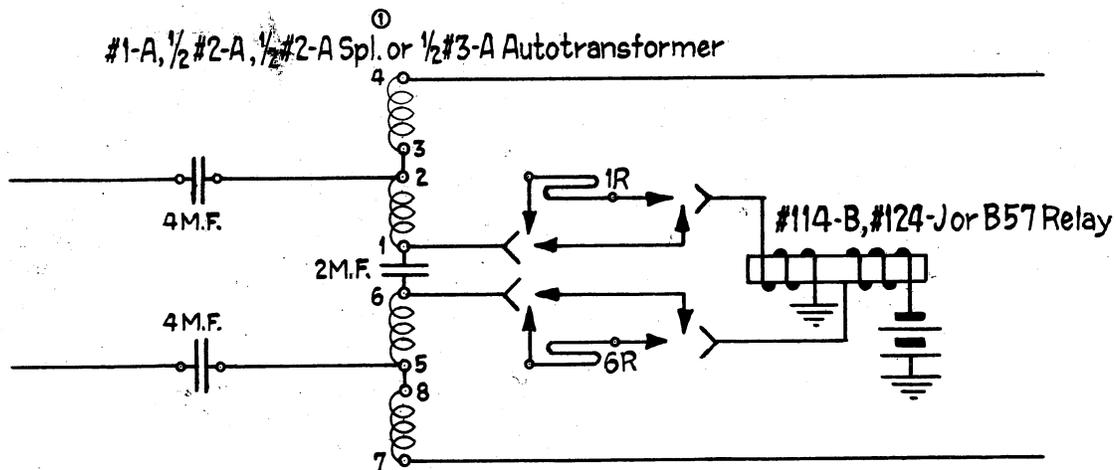
		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave	.5	.7	.8	.5	.7	.8
	Lim.			1.0			.9

FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.5	.7	.8	.5	.7	.8
	Lim.			1.0			1.0

TRANSMISSION CIRCUITS AND LOSSES

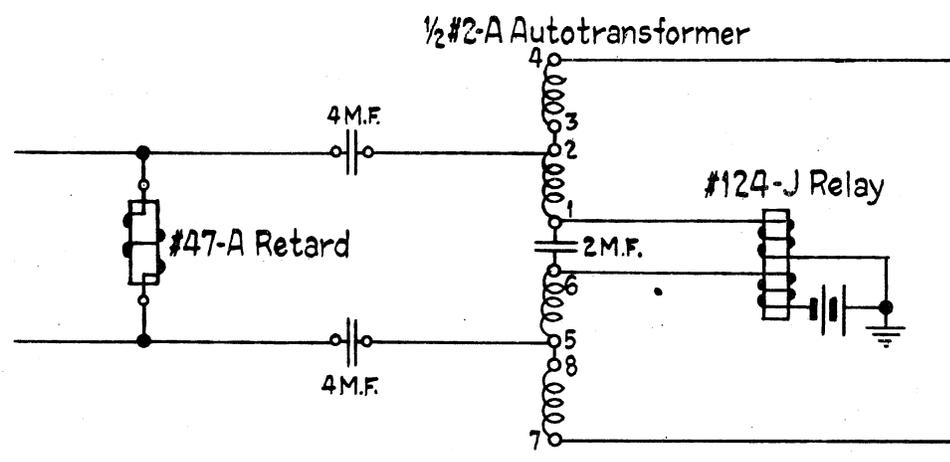


Auto-Trans.		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
#1-A	Ave.						
	Lim.						
$\frac{1}{2}$ #2-A	Ave.	.5	.7	.8	.5	.7	.8
	Lim.			1.0			1.0

① #2-A Spl. = #3-A = $\frac{1}{2}$ #2-A

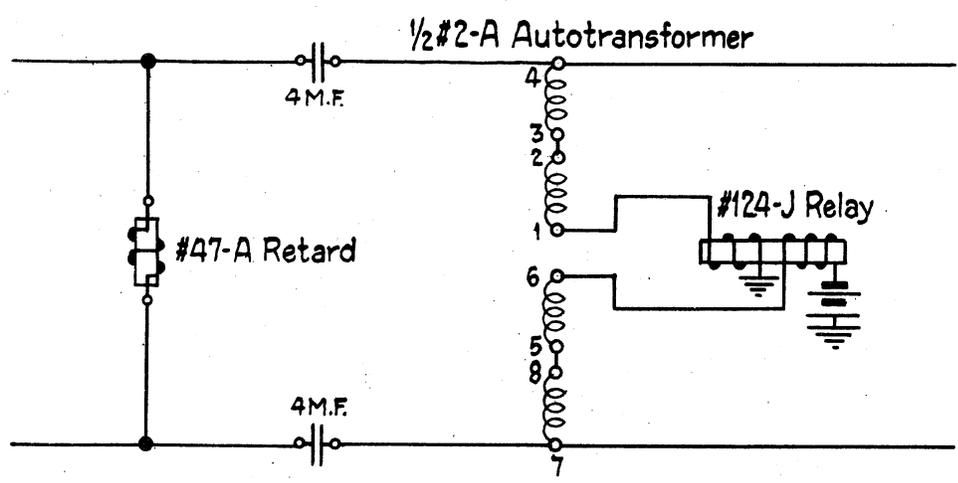
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	1.3	.9	.9	1.0	.9	.9
	Lim.			1.0			1.0

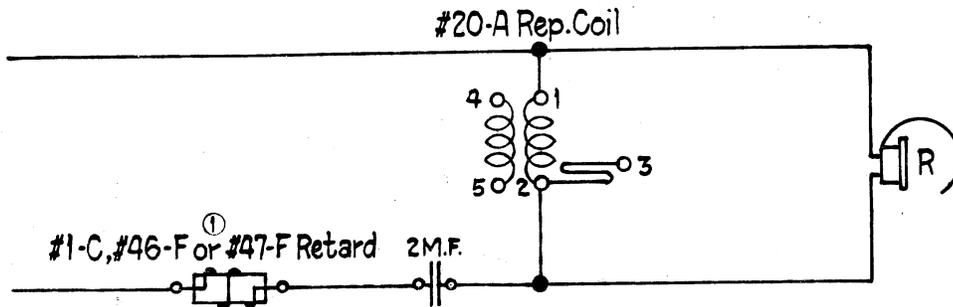
FIG. 2



		800~			1000~		
		2200	1300	600	1800	1200	600
		H	M	L	H	M	L
	Ave.	.9	.5	.2	.7	.4	.2
	Lim.			.5			.5

TRANSMISSION CIRCUITS AND LOSSES

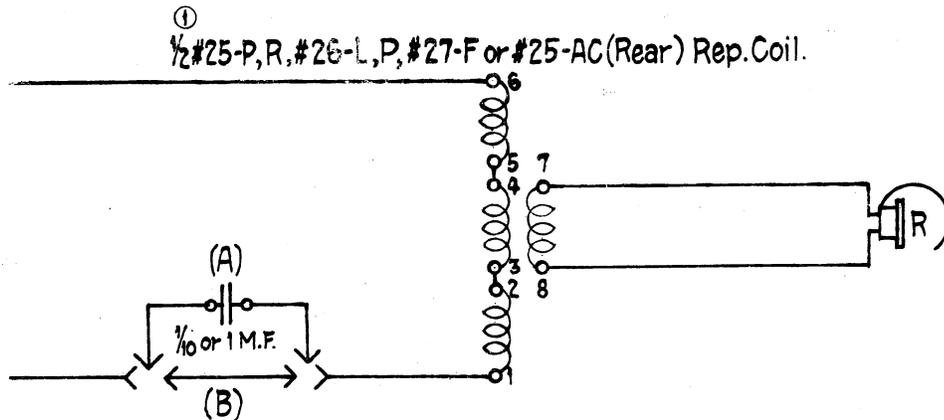
FIG. 1



Retard.		800~				1000~			
		Bridged			Rec.	Bridged			Rec.
		2200	1300	600		1800	1200	600	
		H	M	L	L	H	M	L	L
#1-C	Ave.								
	Lim.								
#46-F	Ave.	.9	.6	.3	18.5	.8	.5	.3	19.3
	Lim.			.5				.4	

① #46-F=#47-F

FIG. 2

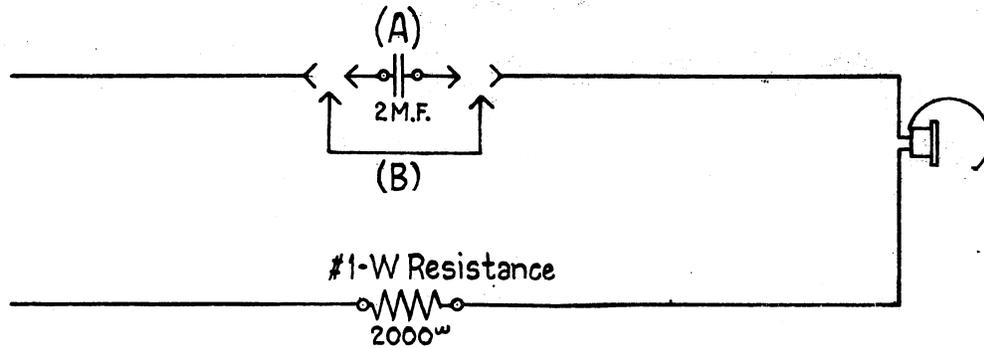


Rep. Coil.	Conditions		800~				1000~			
			Bridged			Rec.	Bridged			Rec.
			2200	1300	600		1800	1200	600	
		H	M	L	L	H	M	L	L	
$\frac{1}{2}$ #25-P	(A) $\frac{1}{10}$ M.F.	Ave.	2.0	1.2	.7	8.0	1.4	.9	.6	8.6
		Lim.			1.0				.8	
	(A) 1M.F.	Ave.	1.4	.9	.5	9.3	1.0	.8	.4	9.5
		Lim.			1.0				.6	
	(B)	Ave.	1.4	.9	.5	9.4	1.0	.8	.4	9.6
		Lim.			1.0				.6	
$\frac{1}{2}$ #25-R	(A) 1M.F.	Ave.								
	Lim.									

① $\frac{1}{2}$ #25-P=#26-P=#27-F = $\frac{1}{2}$ #25-AC (Rear Coil) $\frac{1}{2}$ #25-R=#26-L

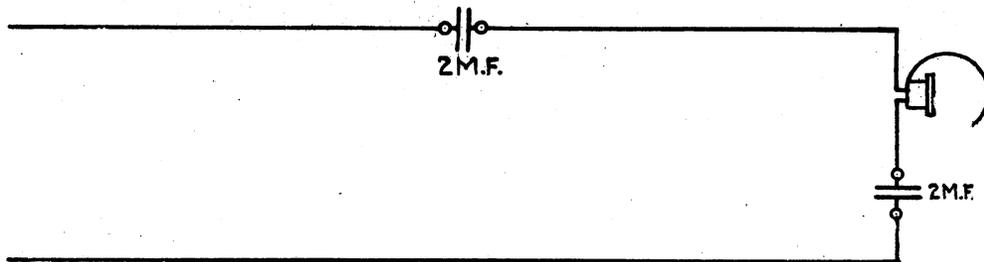
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Conditions		800~				1000~			
		Bridged			Rec.	Bridged			Rec.
		2200	1300	600		1800	1200	600	
	H	M	L	L	H	M	L	L	
(A)	Ave.	3.6	2.3	1.1	8.5	3.0	2.2	1.1	8.5
	Lim.			1.5				1.1	
(B)	Ave.	3.6	2.3	1.1	8.5	3.0	2.2	1.1	8.5
	Lim.			1.5				1.1	

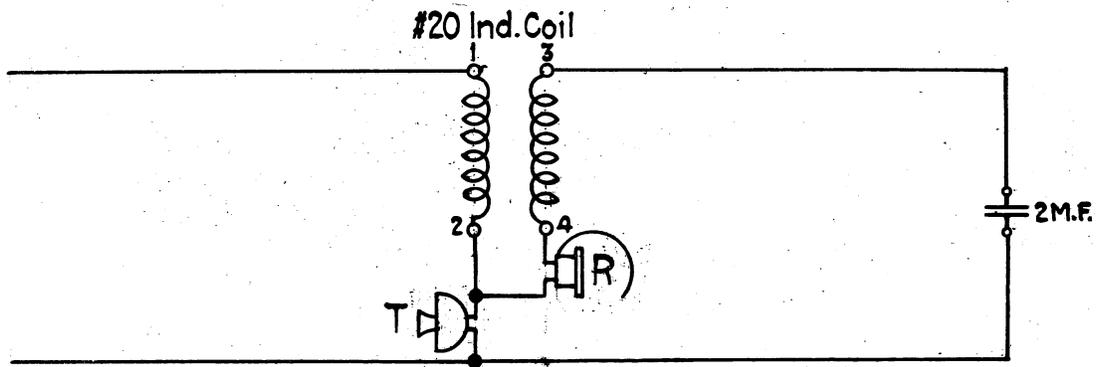
FIG. 2



		800~				1000~			
		Bridged			Rec.	Bridged			Rec.
		2200	1300	600		1800	1200	600	
	H	M	L	L	H	M	L	L	
	Ave.	13.3	9.8	5.6	.1	12.7	10.1	6.2	.1
	Lim.			6.5			6.9		

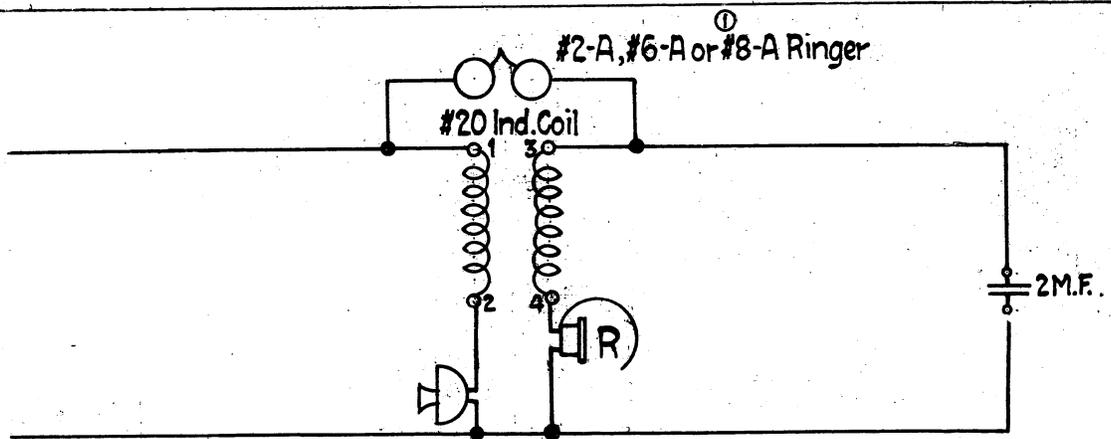
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	9.8	6.9	3.9	4.4	3.4	8.6	6.5	3.9	4.2	2.9
	Lim.					4.5					4.0

FIG. 2

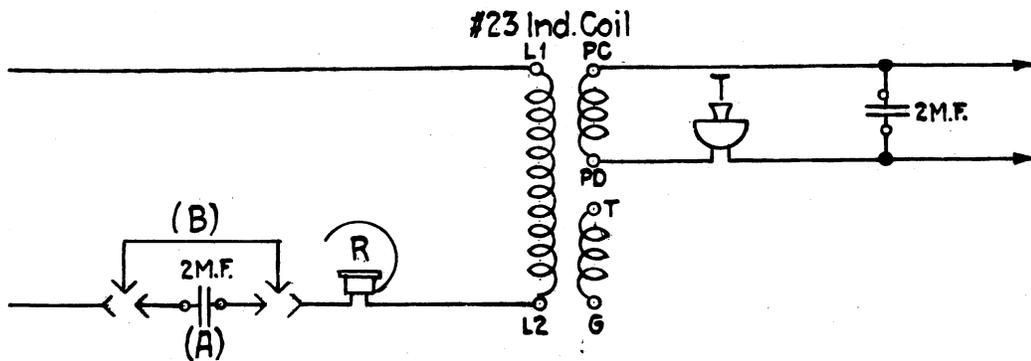


Ringer		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L		H	M	L	L	L
#2-A	Ave.										
	Lim.										
#6-A	Ave.	11.6	8.4	4.9	2.4	2.8	10.4	8.1	4.9	2.4	2.4
	Lim.					4.0					3.4

① #6-A=#8-A

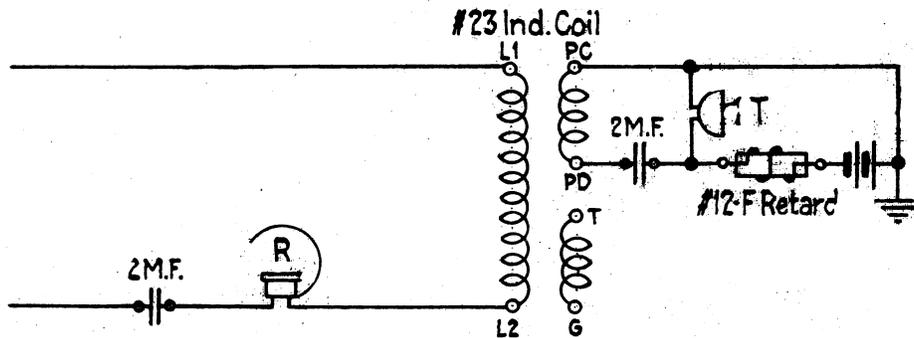
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Conditions		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
(A)	Ave.	4.4	2.8	1.4	6.2	6.3	4.8	3.4	1.9	6.1	5.1
	Lim.				7.0					6.8	
(B)	Ave.	4.5	2.9	1.5	6.3	6.3	4.9	3.5	2.0	6.2	5.1
	Lim.				7.0					6.9	

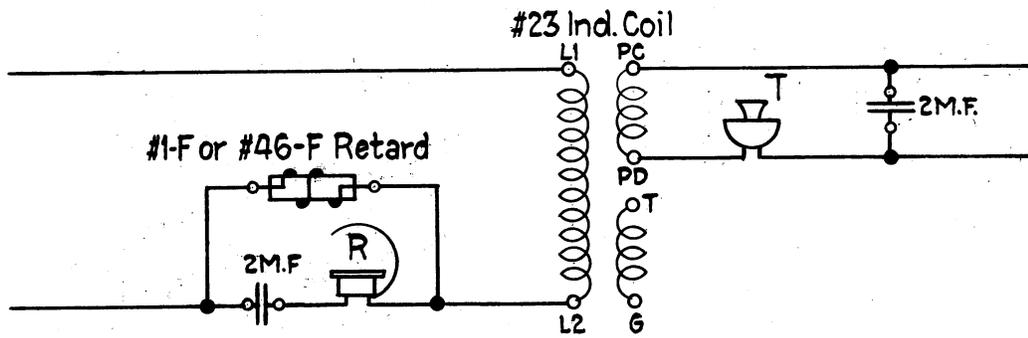
FIG. 2



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	4.4	2.8	1.4	6.2	6.3	4.8	3.4	1.9	6.1	5.1
	Lim.				7.0					6.8	

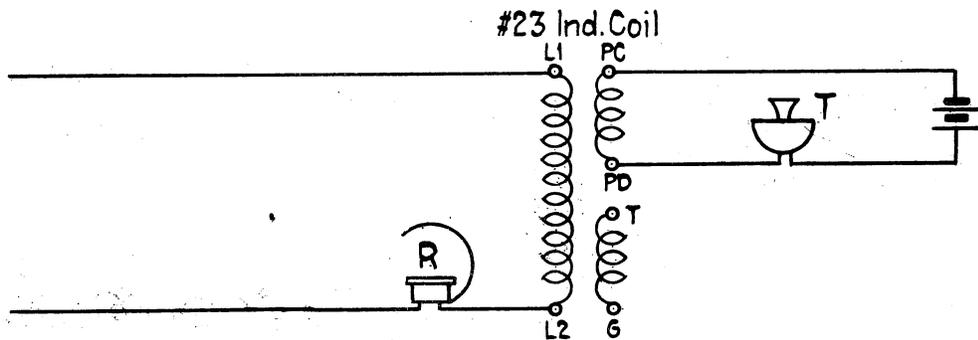
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



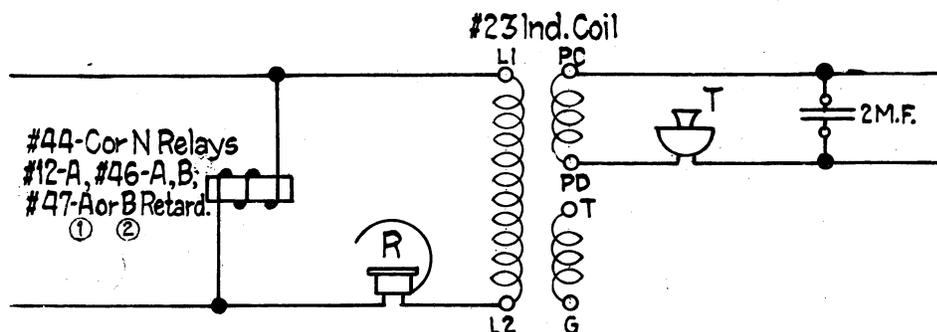
Retard		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L	
#1-F	Ave.										
	Lim.										
#46-F	Ave.	4.5	2.9	1.5	6.1	6.6	4.9	3.5	2.0	5.9	5.4
	Lim.				7.0					6.6	

FIG. 2



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L	
	Ave.	7.1	4.8	2.6	6.3	3.9	6.1	4.4	2.5	6.2	3.9
	Lim.				7.0					7.0	

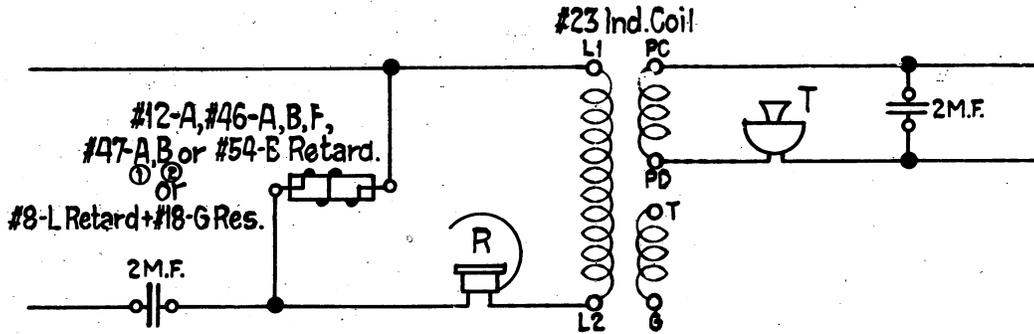
TRANSMISSION CIRCUITS AND LOSSES



Relays or Retard.		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
#44-C	Ave.	4.9	3.2	1.8	6.6	6.5	5.2	3.8	2.2	6.4	5.4
	Lim.				7.5					7.3	
#44-N	Ave.										
	Lim.										
#12-A	Ave.	4.4	2.8	1.4	6.5	6.3	4.8	3.4	1.9	6.2	5.1
	Lim.				7.5					7.0	
#46-A	Ave.	5.0	3.3	1.8	6.7	6.6	5.3	3.9	2.2	6.5	5.4
	Lim.				7.5					7.4	
#46-B	Ave.	6.6	4.5	2.5	8.5	8.0	6.5	4.9	2.8	8.1	6.5
	Lim.				10.0					9.3	

① #46-A=#47-A
② #46-B=#47-B

TRANSMISSION CIRCUITS AND LOSSES

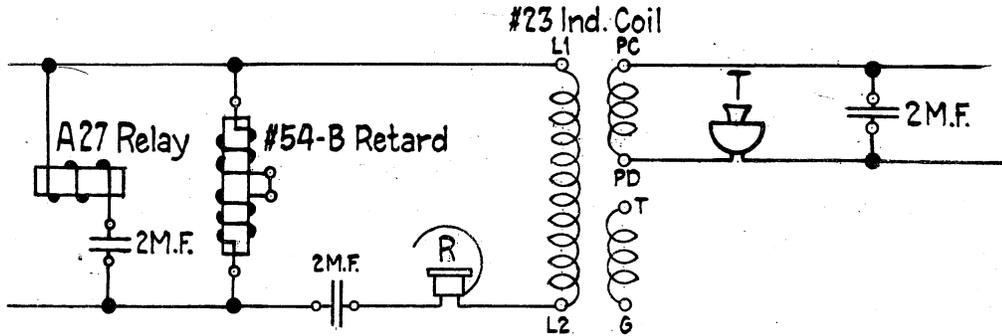


Retard		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
H	M	L	L	L	H	M	L	L	L		
#12-A	Ave.	4.4	2.7	1.4	6.2	6.3	4.7	3.3	1.9	6.1	5.1
	Lim.				7.0					6.9	
#46-A	Ave	4.9	3.2	1.7	6.5	6.7	5.2	3.8	2.2	6.4	5.4
	Lim				7.5				1	7.3	
#46-B	Ave	6.6	4.5	2.5	8.2	7.9	6.5	4.9	2.8	8.0	6.4
	Lim				9.5					9.1	
#46-F	Ave	4.9	3.2	1.6	6.4	6.6	5.2	3.8	2.1	6.1	5.4
	Lim.				7.5					6.9	
#54-B	Ave.	4.5	2.9	1.6	6.1	6.5	5.0	3.5	2.0	6.1	5.1
	Lim.				7.0					6.8	
#8-L + #18-G Res.	Ave.	4.5	2.9	1.5	6.1	6.4	4.9	3.5	2.0	6.0	5.2
	Lim.				7.0					6.7	

① #46-A-#47-A
② #46-B-#47-B

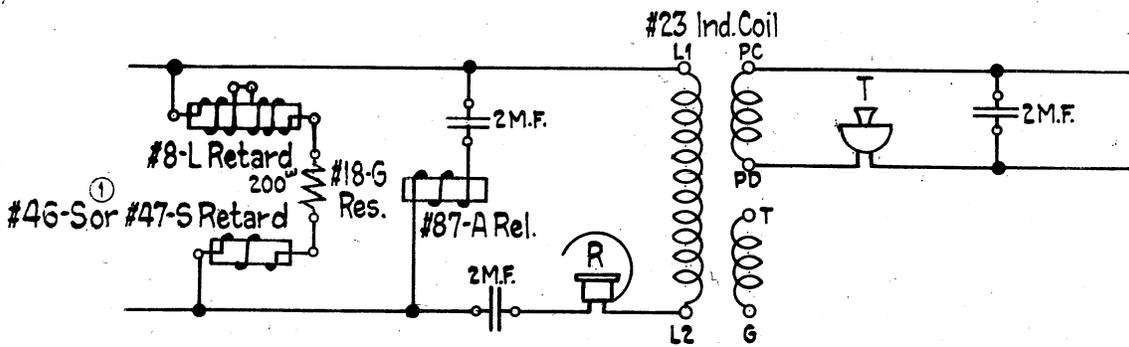
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			H	M	L		
	Ave.	4.6	3.0	1.6	6.1	6.4	5.0	3.6	2.0	6.0	5.2
	Lim				7.0					6.7	

FIG. 2

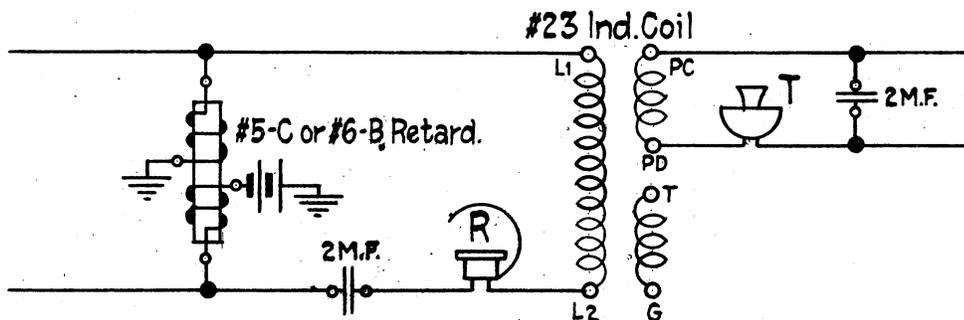


		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			H	M	L		
	Ave.	4.6	3.0	1.6	6.1	6.4	5.0	3.6	2.0	6.0	5.2
	Lim				7.0					6.7	

① #46-S = #47-S Retard

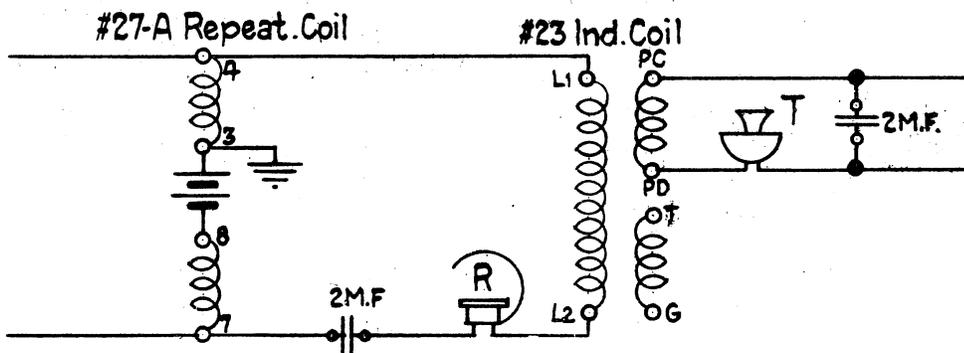
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1.



Retard		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
#5-C	Ave.	4.4	2.8	1.4	6.2	6.3	4.8	3.4	1.9	6.1	5.1
	Lim.				7.0					6.8	
#6-B	Ave.										
	Lim.										

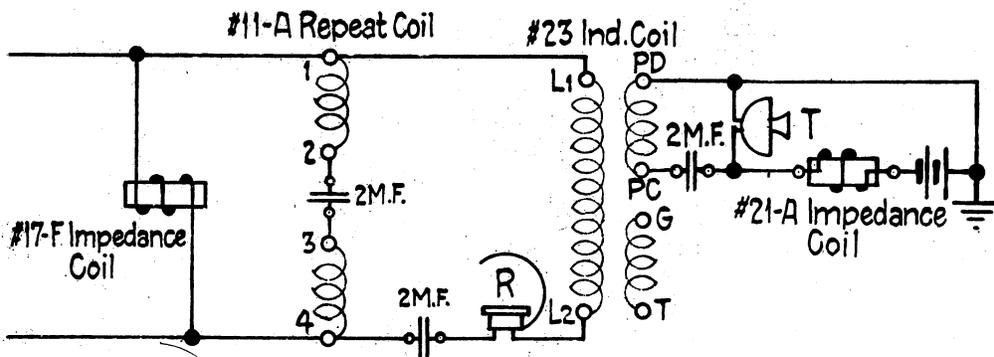
FIG. 2.



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	4.4	2.8	1.4	6.4	6.3	4.8	3.4	1.9	6.2	5.1
	Lim.				7.5					7.1	

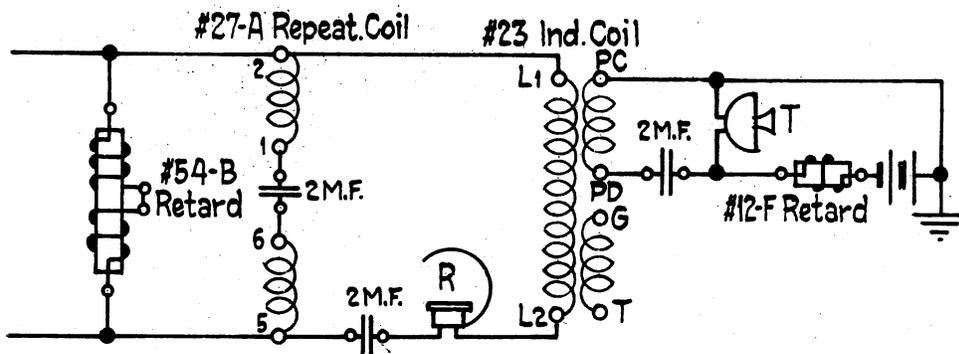
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600	L	L	1800	1200	600	L	L
		H	M	L	L	L	H	M	L	L	L
	Ave.										
	Lim.										

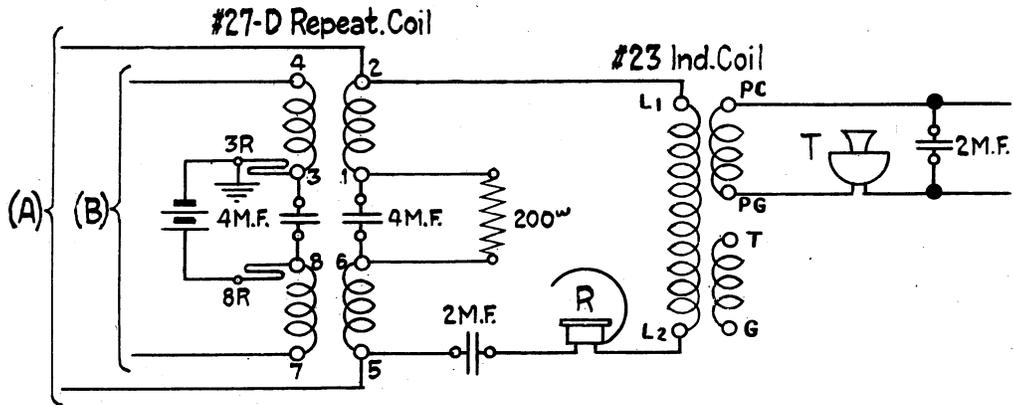
FIG. 2



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600	L	L	1800	1200	600	L	L
		H	M	L	L	L	H	M	L	L	L
	Ave.	4.5	2.9	1.5	6.2	6.3	4.8	3.5	2.0	6.1	5.1
	Lim.				7.0					6.9	

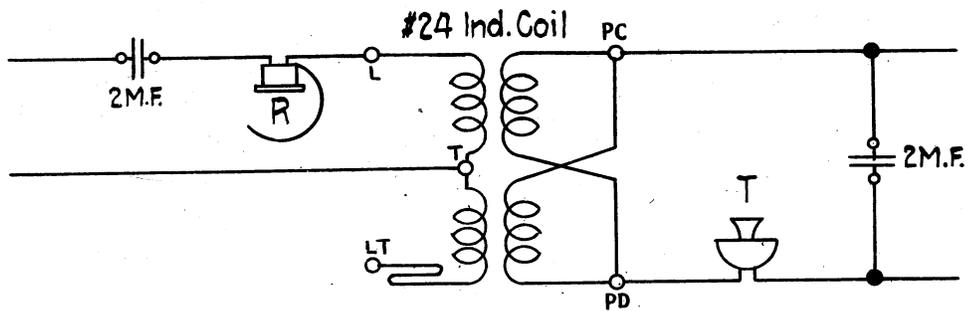
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Conditions		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
(A)	Ave.	4.4	2.8	1.4	6.4	6.3	4.8	3.4	1.9	6.2	5.1
	Lim.				7.5					7.1	
(B)	Ave.	4.1	2.7	1.3	6.7	7.0	4.4	3.2	1.8	6.5	5.7
	Lim.				8.0					7.6	

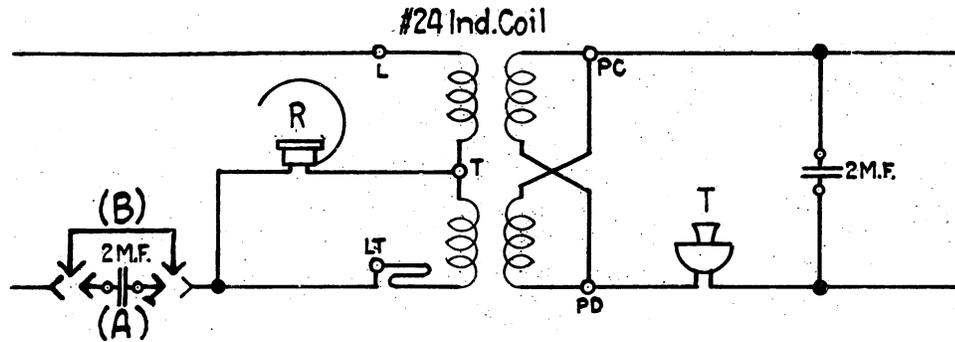
FIG. 2



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	9.3	6.6	3.7	5.6	2.3	9.0	6.9	4.2	4.7	1.9
	Lim.			4.5	7.0				4.8	5.4	

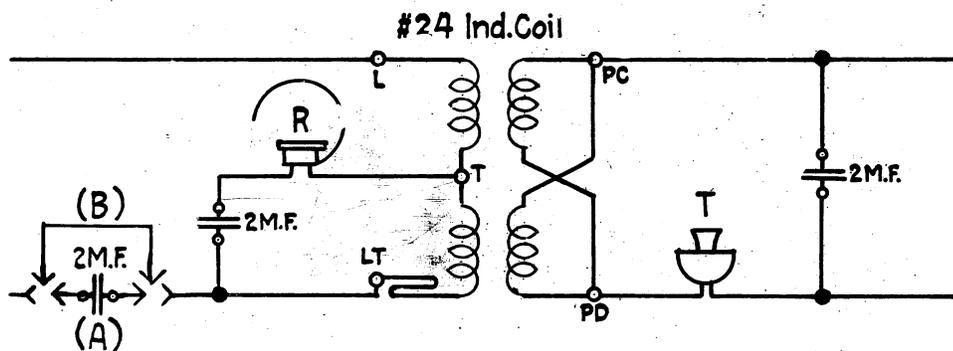
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



Conditions		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
	Ave.	H	M	L	L	L	H	M	L	L	L
(A)	Ave.	8.9	6.2	3.4	7.1	4.8	8.7	6.6	3.9	6.8	5.0
	Lim.			4.5	8.5				4.5	7.8	
(B)	Ave.	9.3	6.4	3.6	7.2	4.7	9.0	6.9	4.2	6.8	4.9
	Lim.			4.5	9.0				4.8	7.8	

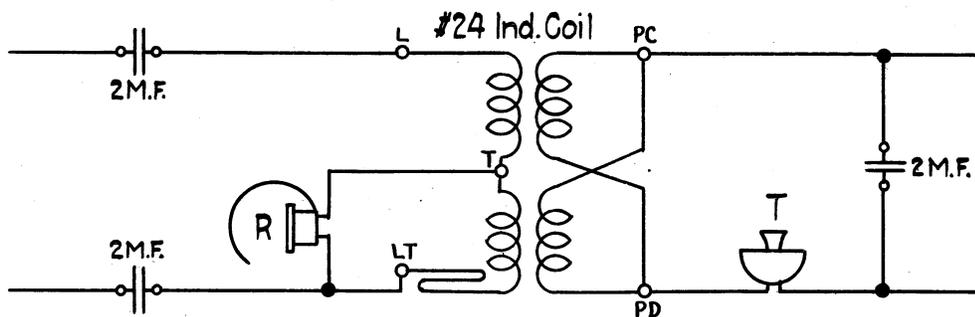
FIG. 2



Conditions		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
	Ave.	H	M	L	L	L	H	M	L	L	L
(A)	Ave.	8.6	6.1	3.2	7.1	4.8	8.5	6.5	3.8	6.8	5.0
	Lim.			4.0	8.5				4.4	7.8	
(B)	Ave.	9.2	6.4	3.6	7.2	4.7	8.9	6.8	4.1	6.9	4.9
	Lim.			4.5	9.0				4.7	7.9	

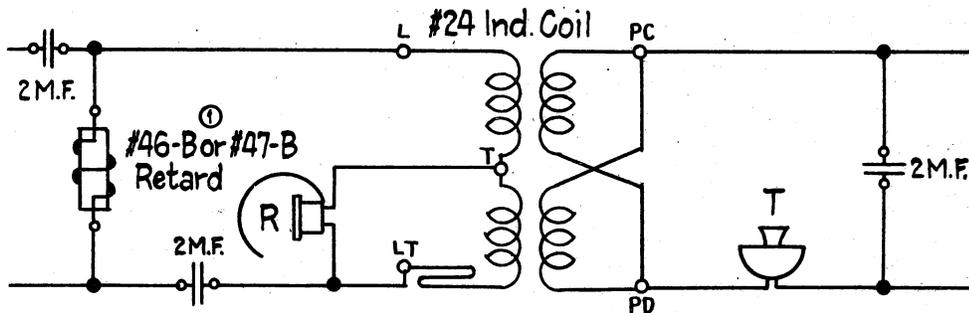
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	8.9	6.2	3.5	7.0	4.9	8.7	6.7	4.0	6.7	5.1
	Lim.			4.5	8.5				4.6	7.7	

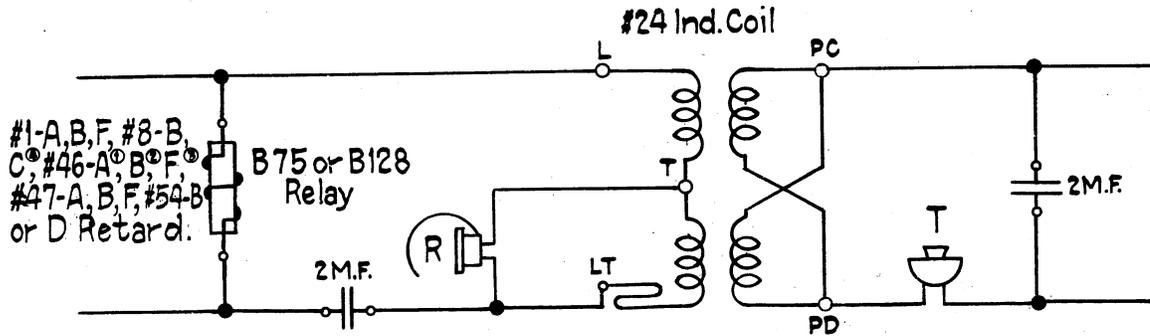
FIG. 2



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	10.1	7.3	4.2	8.4	6.1	9.7	7.5	4.5	8.0	6.1
	Lim.			5.0	10.0				5.3	9.0	

① #46-B=#47-B.

TRANSMISSION CIRCUITS AND LOSSES

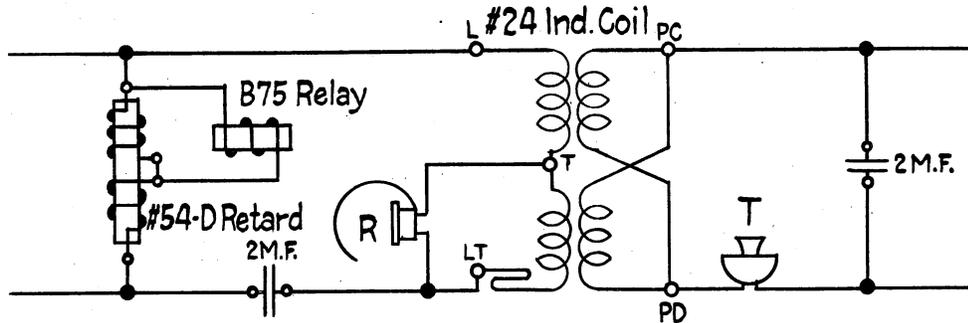


Retard Coil or Relay		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
#47-A	Ave.	9.1	6.4	3.6	7.4	5.1	8.9	6.8	4.1	7.1	5.2
	Lim.			4.5	9.0				4.8	8.1	
#47-B	Ave.	10.0	7.2	4.1	8.6	6.2	9.7	7.5	4.5	8.0	6.2
	Lim.			5.5	10.5				5.6	9.4	
#47-F	Ave.	9.1	6.4	3.6	7.4	5.1	8.9	6.8	4.1	7.1	5.2
	Lim.			4.5	9.0				4.8	8.1	
#8-B	Ave.	9.0	6.3	3.4	7.4	4.8	8.8	6.6	3.9	7.0	5.0
	Lim.			4.5	9.0				4.5	8.0	
#54-B	Ave.	8.9	6.2	3.4	7.2	4.8	8.7	6.6	3.9	6.8	5.0
	Lim.			4.5	9.0				4.5	7.8	
#54-D	Ave.	9.0	6.3	3.4	7.5	4.8	8.8	6.6	3.9	7.1	5.0
	Lim.			4.5	9.5				4.7	8.2	
#1-A	Ave.										
	Lim.										
#1-B	Ave.	10.2	7.3	4.1	8.8	6.2	9.9	7.7	4.6	8.2	6.2
	Lim.			5.0	10.5				5.5	9.4	
#1-F	Ave.										
	Lim.										
B75	Ave.	9.0	6.3	3.4	7.5	4.8	8.8	6.6	3.9	7.1	5.0
	Lim.			4.5	9.0				4.5	8.0	
B128	Ave.										
	Lim.										

① #47-A=#46-A ② #47-B=#46-B ③ #47-F=#46-F ④ #8-B=#8-C

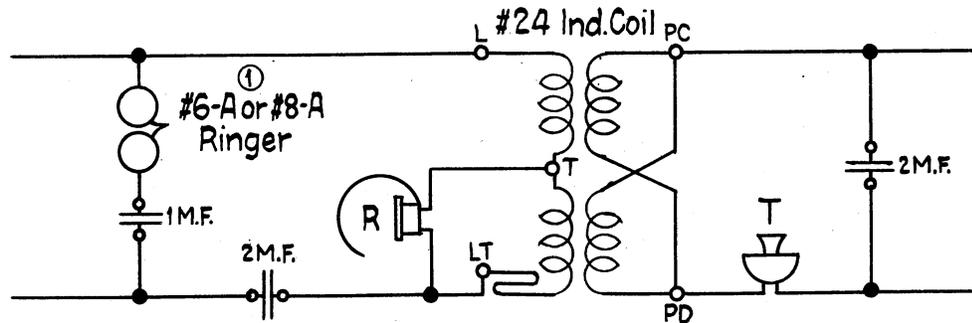
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
Ave.		8.9	6.2	3.4	7.4	4.8	8.7	6.6	3.9	7.0	5.0
Lim.				4.5	9.0				4.7	8.1	

FIG. 2

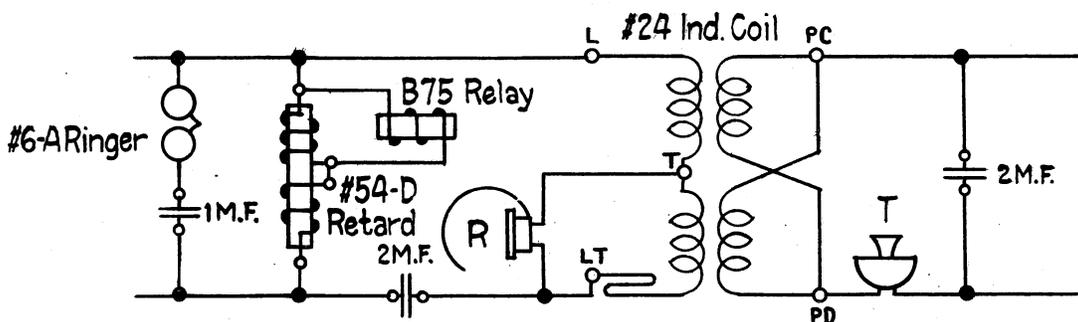


		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
Ave.		8.9	6.2	3.4	7.2	4.8	8.7	6.6	3.9	6.8	5.0
Lim.				4.5	9.0				4.5	7.8	

① #6-A = #8-A.

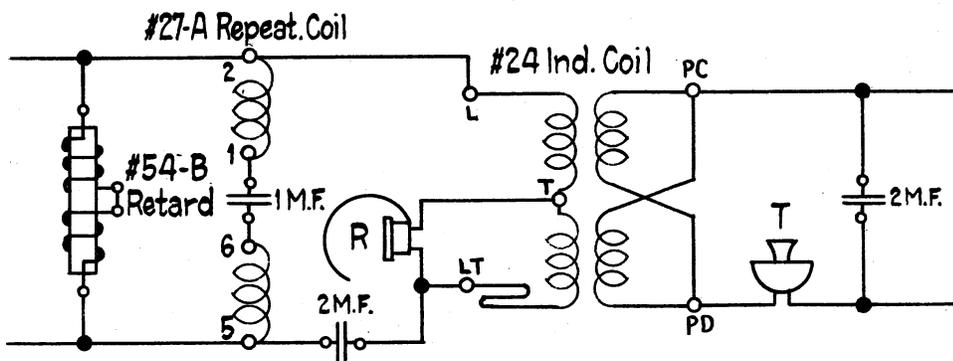
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



	800~					1000~				
	Bridged			Trans	Rec.	Bridged			Trans	Rec
	2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L
Ave.	8.9	6.2	3.4	7.2	4.9	8.7	6.6	3.9	6.9	5.0
Lim.			4.5	9.0				4.6	8.0	

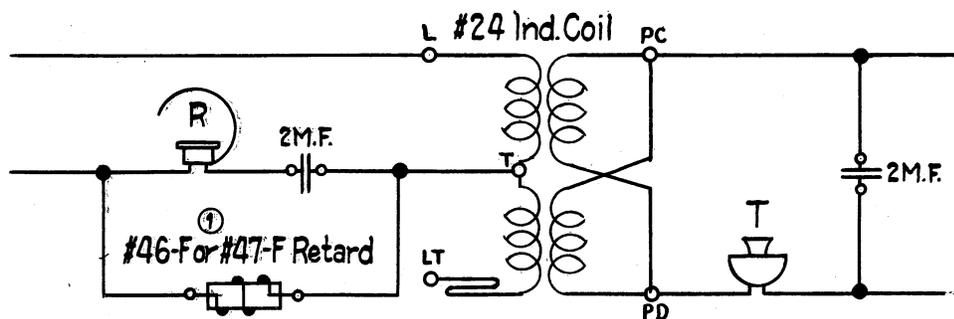
FIG. 2



	800~					1000~				
	Bridged			Trans	Rec.	Bridged			Trans	Rec.
	2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L
Ave.	9.0	6.3	3.4	7.4	4.8	8.8	6.6	3.9	7.0	5.0
Lim.			4.5	9.0				4.6	8.0	

TRANSMISSION CIRCUITS AND LOSSES

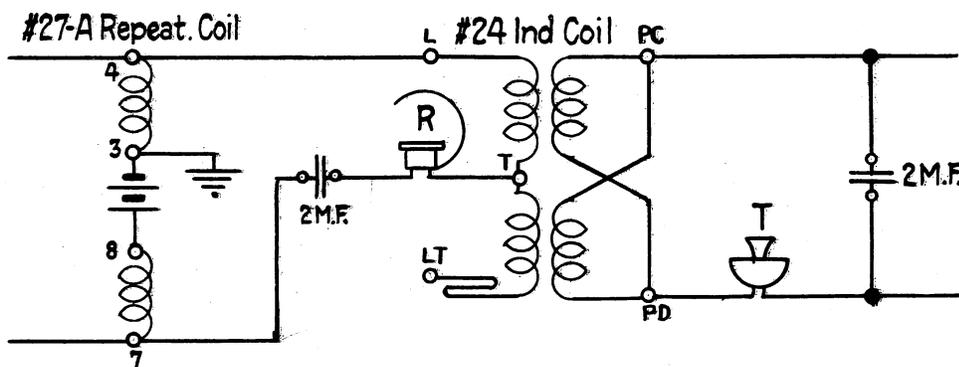
FIG.1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	9.3	6.6	3.7	5.7	2.6	9.0	6.9	4.2	4.8	2.2
	Lim.			4.5	7.0				4.8	5.6	

① #46-F=#47-F

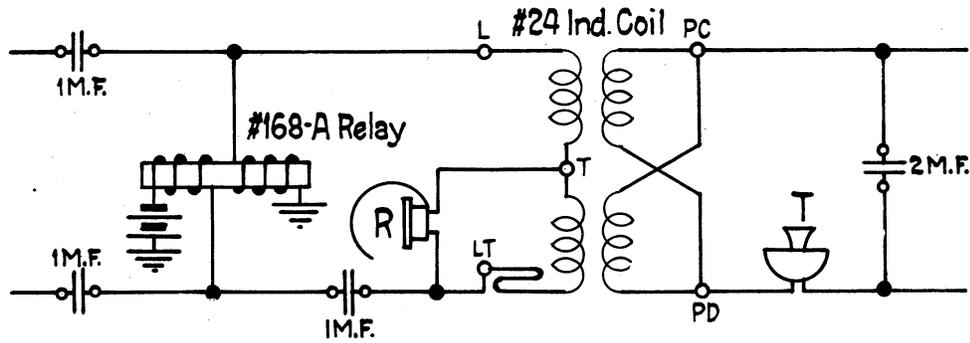
FIG.2



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	9.1	6.4	3.6	5.9	2.3	9.0	6.9	4.2	4.9	2.1
	Lim.			4.5	7.0				4.9	5.8	

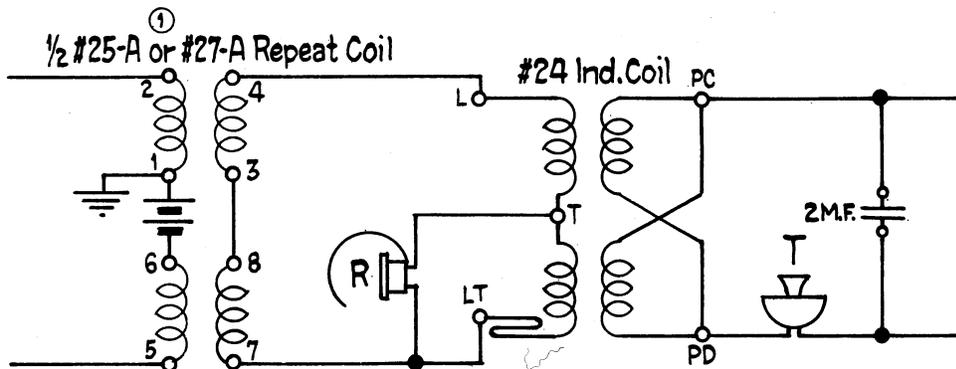
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
Ave.											
Lim.											

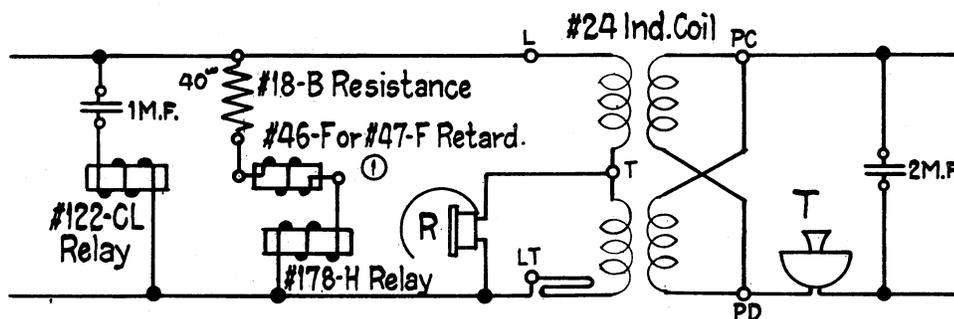
FIG. 2



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
Ave.		8.6	6.2	3.6	8.1	5.2	8.2	6.4	4.1	7.7	5.4
Lim.				4.5	10.0				4.7	8.9	

TRANSMISSION CIRCUITS AND LOSSES

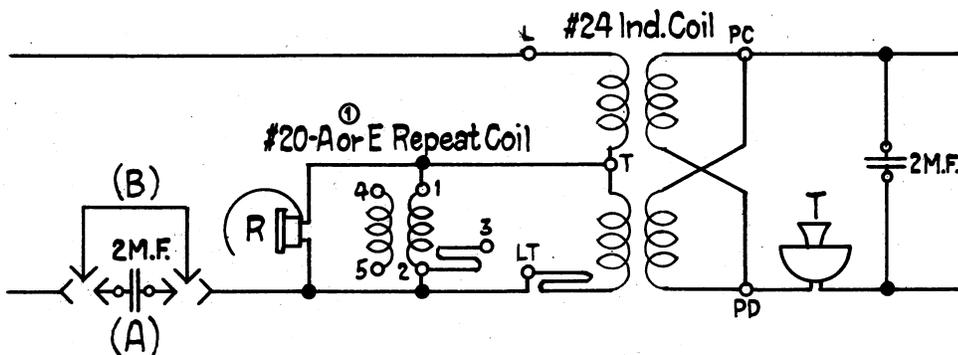
FIG. 1



	800~					1000~				
	Bridged			Trans	Rec	Bridged			Trans	Rec
	2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L
Ave.	9.8	6.9	3.8	7.8	5.2	9.3	7.2	4.4	7.3	5.2
Lim			5.0	9.5				5.3	8.5	

① #46-F = #47-F

FIG. 2

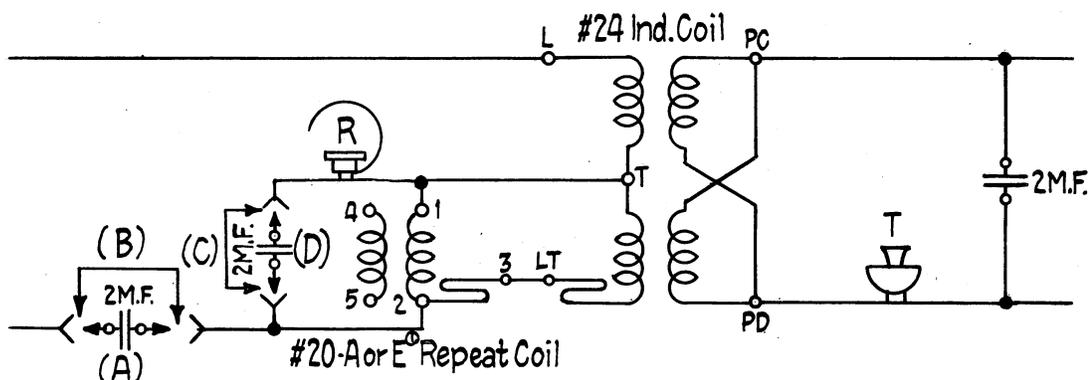


Conditions	800~					1000~					
	Bridged			Trans	Rec	Bridged			Trans	Rec	
	2200	1300	600			1800	1200	600			
	H	M	L	L	L	H	M	L	L	L	
(A)	Ave	9.0	6.2	3.4	7.0	4.9	8.7	6.7	4.0	6.7	5.1
	Lim			4.5	8.5			4.6	7.7		
(B)	Ave	9.3	6.4	3.6	7.2	4.8	9.0	6.9	4.2	6.8	5.0
	Lim			4.5	9.0			4.8	7.8		

① #20-A or #20-E Repeat coils in this circuit cause the same loss.

TRANSMISSION CIRCUITS AND LOSSES

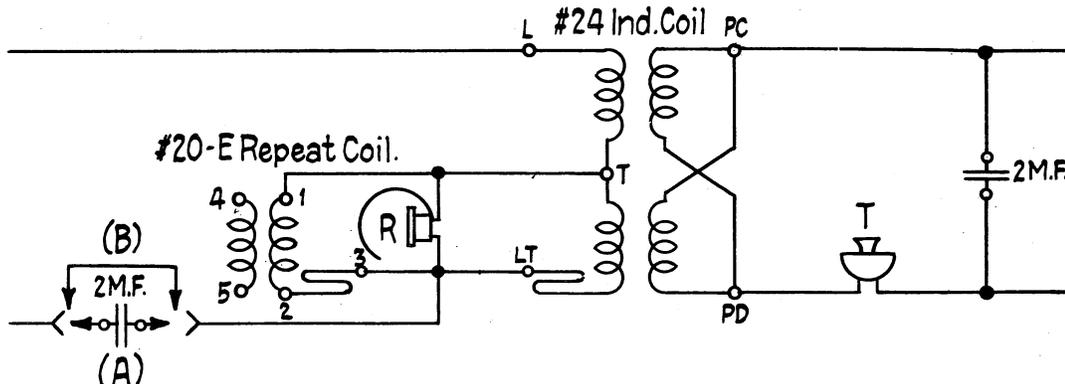
FIG. 1



Conditions		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L	
(AC)	Ave.	9.0	6.2	3.4	6.5	4.2	8.7	6.7	4.0	6.1	4.3
	Lim.			4.5	8.0				4.6	6.9	
(BC)	Ave.	9.3	6.4	3.6	6.7	4.1	9.0	6.9	4.2	6.2	4.3
	Lim.			4.5	8.5				4.8	7.1	
(AD)	Ave.										
	Lim.										
(BD)	Ave.										
	Lim.										

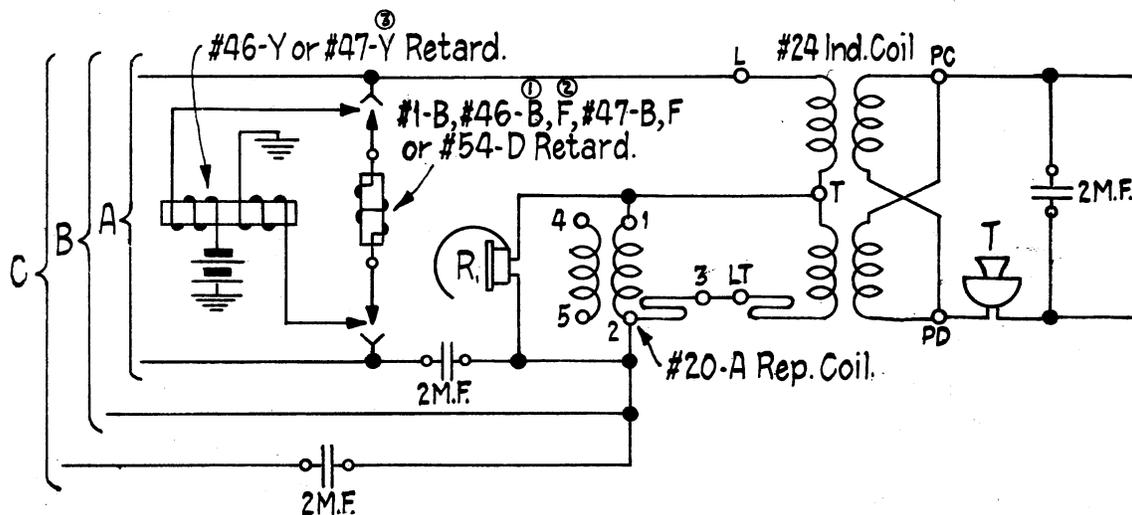
① #20-A or E repeat coils in this circuit cause the same loss.

FIG. 2



Conditions		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L	
(A)	Ave.	9.0	6.2	3.4	7.0	5.0	8.7	6.7	4.0	6.7	5.1
	Lim.			4.5	8.5				4.6	7.7	
(B)	Ave.	9.3	6.4	3.6	7.2	4.9	9.0	6.9	4.2	6.9	5.1
	Lim.			4.5	9.0				4.8	7.9	

TRANSMISSION CIRCUITS AND LOSSES

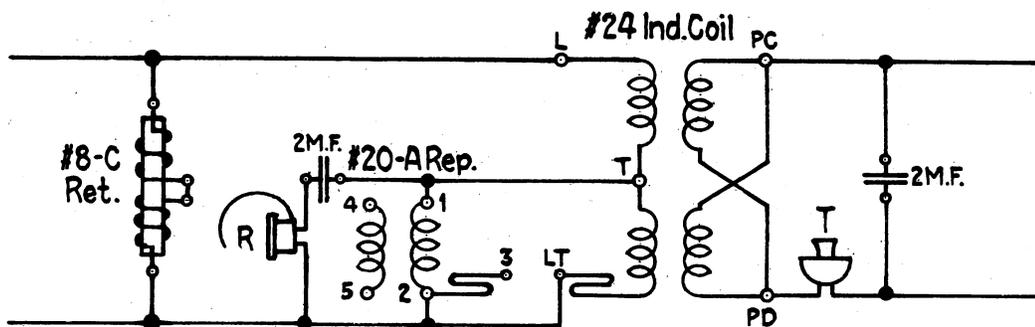


Conditions	Retard Coil		800~					1000~					
			Bridged			Trans	Rec	Bridged			Trans	Rec.	
			2200	1300	600			1800	1200	600			
H	M	L	L	L	H	M	L	L	L				
A	#1-B	Ave.											
		Lim.											
	#47-B	Ave.	10.2	7.3	4.2	8.0	5.6	9.8	7.6	4.5	7.4	5.3	
		Lim.			5.5	10.0				5.6	8.7		
	#47-F	Ave.	9.3	6.4	3.6	6.8	4.6	9.0	6.9	4.2	6.3	4.4	
		Lim.			4.5	8.5				4.9	7.4		
	#47-Y	Ave.	9.1	6.3	3.5	6.6	4.4	8.8	6.8	4.1	6.2	4.4	
		Lim.			4.5	8.0				4.7	7.2		
	#54-D	Ave.	9.0	6.2	3.4	6.7	4.4	8.7	6.7	4.0	6.2	4.4	
		Lim.			4.5	8.5				4.8	7.4		
B	#1-B	Ave.											
		Lim.											
	#46-B	Ave.											
		Lim.											
C	#46-B	Ave.											
		Lim.											

① #47-B=#46-B
 ② #47-F=#46-F
 ③ #47-Y=#46-Y

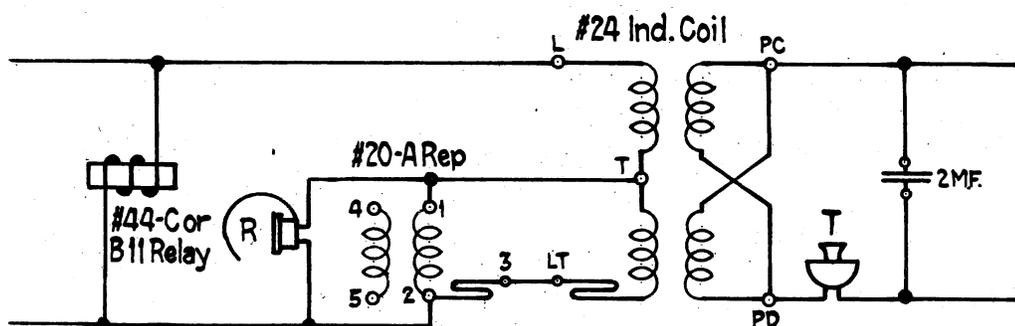
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	9.2	6.4	3.6	7.3	4.9	8.9	6.8	4.1	6.9	5.0
	Lim.			4.5	9.0				4.7	7.9	

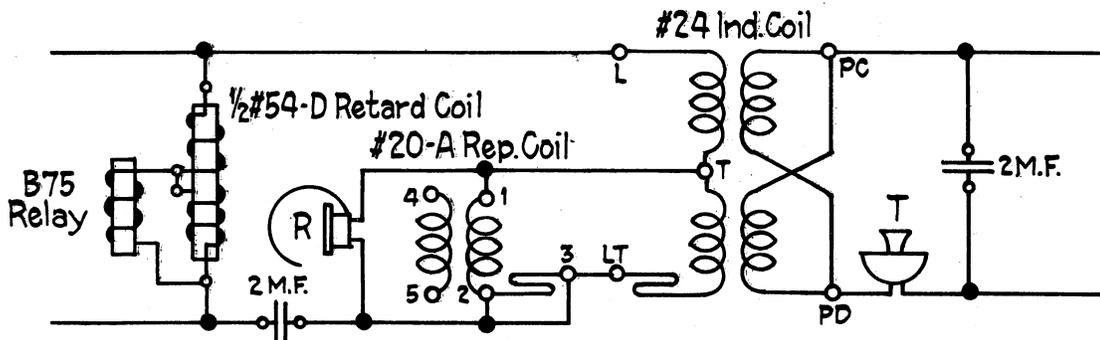
FIG. 2



Relay		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
#44-C	Ave.	9.6	6.8	3.8	7.0	4.5	9.2	7.1	4.3	6.5	4.4
	Lim.			5.0	8.5				5.0	7.6	
B11	Ave.	9.4	6.6	3.7	6.7	4.3	9.0	6.9	4.2	6.2	4.3
	Lim.			4.5	7.5				4.9	7.3	

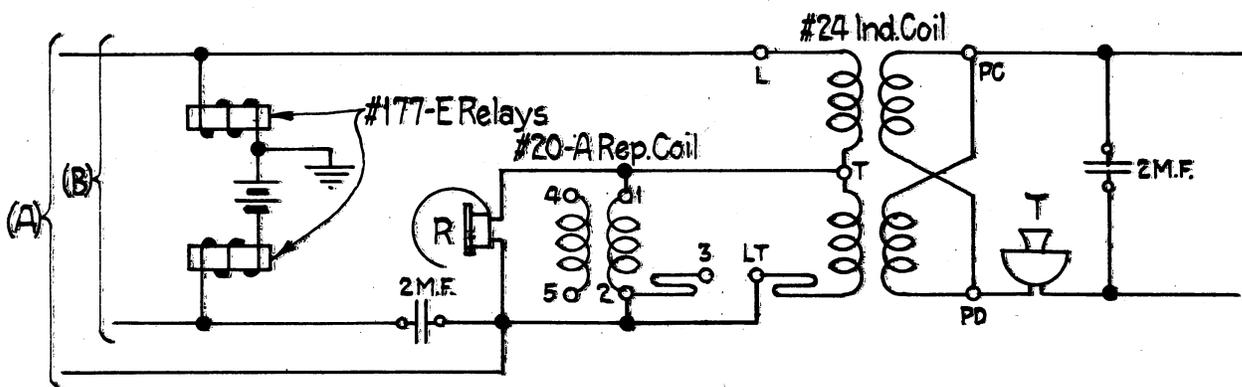
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	9.0	6.2	3.4	7.3	5.0	8.7	6.7	4.0	6.9	5.1
	Lim.			4.5	9.0				4.8	8.0	

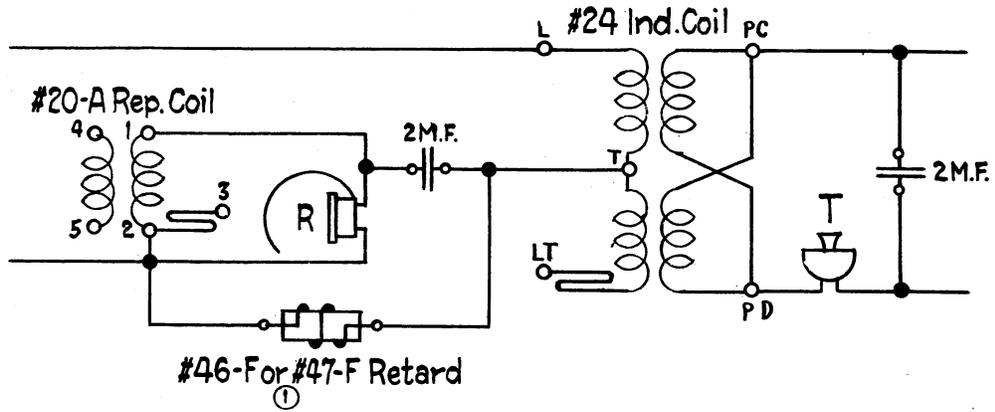
FIG. 2



Conditions		800~					1000~				
		Bridged			Trans	Rec.	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
(A)	Ave.	9.2	6.4	3.6	7.3	4.9	8.9	6.8	4.1	6.9	5.0
	Lim.			4.5	9.0				4.7	7.9	
(B)	Ave.	9.0	6.2	3.4	7.3	5.0	8.7	6.7	4.0	6.9	5.1
	Lim.			4.5	9.0				4.6	7.9	

TRANSMISSION CIRCUITS AND LOSSES

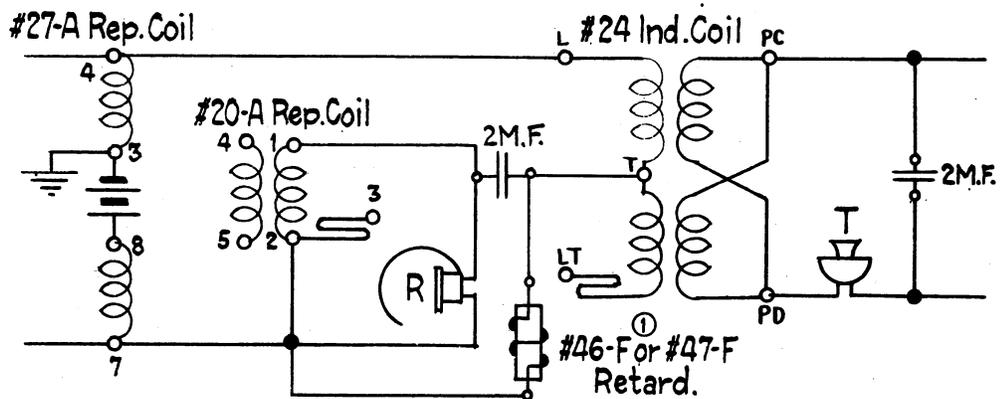
FIG. 1



	800~					1000~				
	Bridged			Trans	Rec	Bridged			Trans	Rec.
	2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L
Ave.	9.4	6.6	3.6	5.5	2.7	9.1	6.9	4.2	4.6	2.2
Lim.			4.5	7.0				4.8	5.4	

① #46-F=#47-F.

FIG. 2

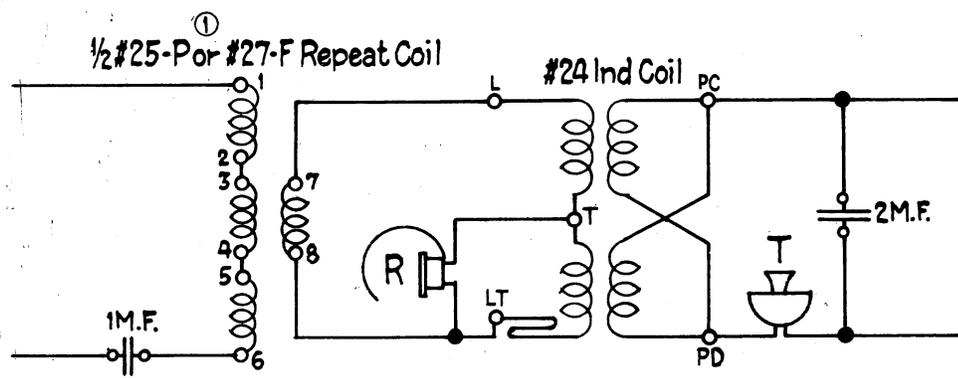


	800~					1000~				
	Bridged			Trans	Rec	Bridged			Trans	Rec
	2200	1300	600			1800	1200	600		
	H	M	L	L	L	H	M	L	L	L
Ave	9.3	6.4	3.6	5.7	2.7	9.1	6.9	4.2	4.8	2.3
Lim			4.5	7.0				4.9	5.7	

① #46-F=#47-F

TRANSMISSION CIRCUITS AND LOSSES

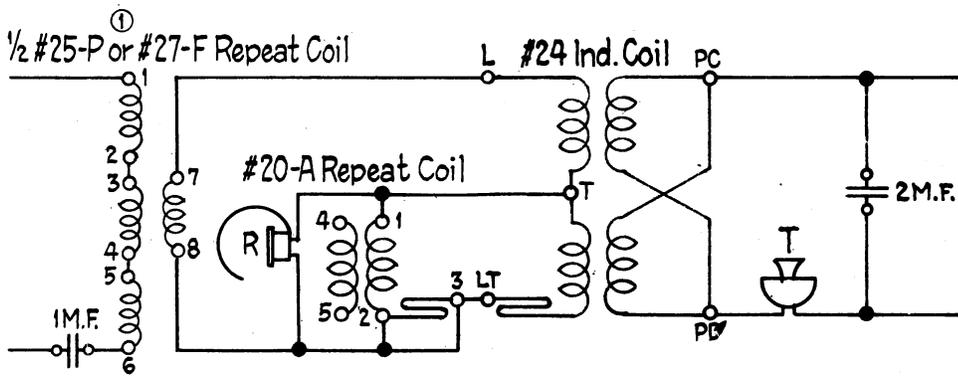
FIG. 1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
Ave.		.7	.4	.2	17.8	15.0	.6	.4	.2	17.7	14.7
Lim.				.5					.4		

① $\frac{1}{2}$ #25-P = #27-F.

FIG. 2

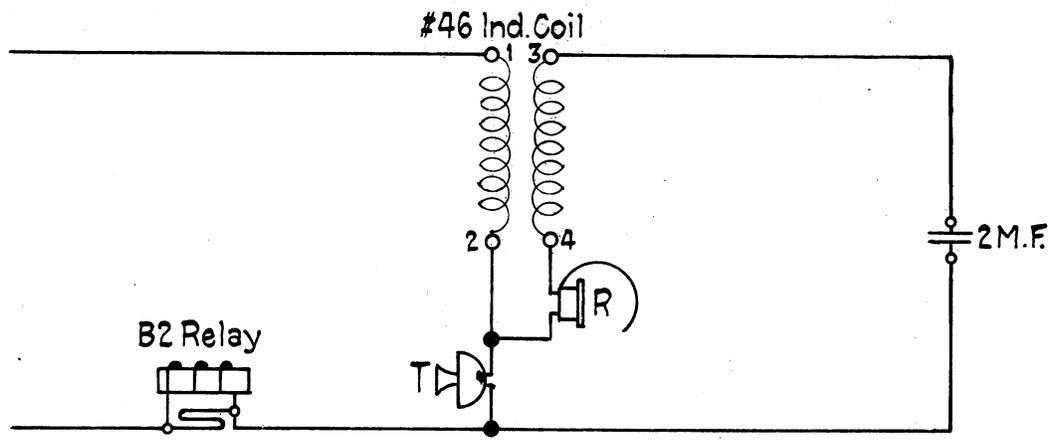


		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
Ave.		.7	.4	.2	18.0	15.1	.6	.4	.2	17.9	14.9
Lim				.5					.4		

① $\frac{1}{2}$ #25-P = #27-F

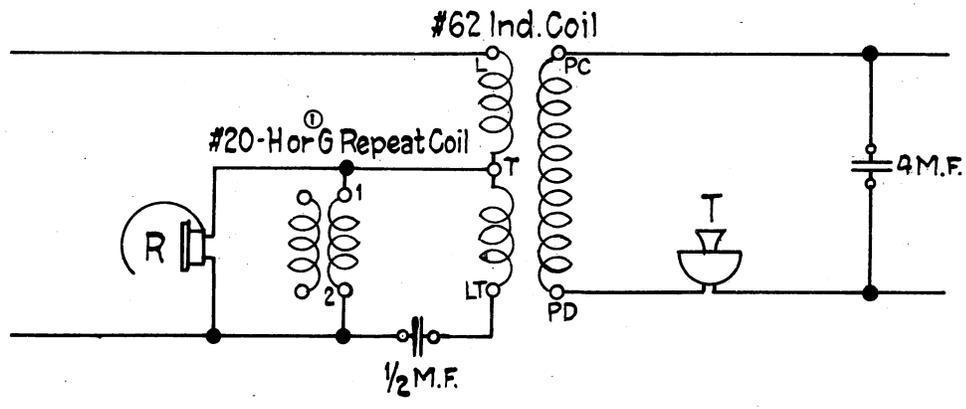
TRANSMISSION CIRCUITS AND LOSSES

FIG. 1



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.	7.7	5.2	2.7	5.6	3.7	6.6	4.9	2.7	5.2	3.3
	Lim					5.0					4.4

FIG. 2



		800~					1000~				
		Bridged			Trans	Rec	Bridged			Trans	Rec.
		2200	1300	600			1800	1200	600		
		H	M	L	L	L	H	M	L	L	L
	Ave.										
	Lim										

① #20-H or #20-G repeat coils in this circuit cause the same loss.