

MODEL C710,
Ch. 133

SPECIFICATIONS

The Hoffman Model C710 DraweRECORDER is a drawer-mounted disc recorder unit comprising a recording table and cutting arm for 78 rpm inside-out disc recording up to 10" diameter, and a self-contained amplifier and microphone preamplifier. The unit is normally used as a recorder only, and as such is installed in the record storage compartment of Hoffman radio-phonograph combinations. However, it may also be modified for use as a self-contained recorder and playback unit by the addition of a speaker and playback arm. (See Service Data No. 30, Chassis 133.)



APPLICATION

The Hoffman Model C710 DraweRECORDER may be installed in the following Hoffman receivers produced prior to the issuance of this data:

C506	C510	D522	900	912
C507	C515	D524	901	913
C509	C516	C530	902	C1006

In ordering Model C710, be sure to specify the model number of the set in which it is to be installed.

METHOD OF INSTALLATION

1. If the receiver cabinet has 13/16" side panels or 3/8" side panels with a clear on the inside of the record compartment, locate and drill the mounting holes for the DraweRECORDER shelf per the instructions on the template furnished with the shelf.
2. If the receiver cabinet has 3/8" thick side panels with no clear in the record compartment, it will be necessary to provide additional support for the outer end of the shelf. Glue a 1/2" thick by 3" wide by approximately 12" long wood clear on the inside cabinet side panel of the record compartment, centering it at the hole location given on the template.
3. Locate and drill holes in the center partition of the receiver cabinet per the instructions on the template.
4. Mount the shelf using the wood screws at the outer end and the machine screws at the center through the partition.
5. Install the DraweRECORDER and adjust the slides as necessary for free operation.

6. Plug the AC lead from the DraweRECORDER into the receptacle on the receiver, and the audio lead into the jack marked "television" or "recorder." The Model C710 may be used to record signals from any type of home receiver by the addition of a connection in the audio circuit, ahead of the volume control and by making provision for the AC to the recorder.

MAJOR COMPONENTS

Amplifier and Recorder Chassis	133 (See Service Data No. 30)
Microphone	Part No. 9014
Drawer	Part No. 6540
Shelf	(Specify receiver model No. when ordering)

ELECTRICAL AND MECHANICAL DATA

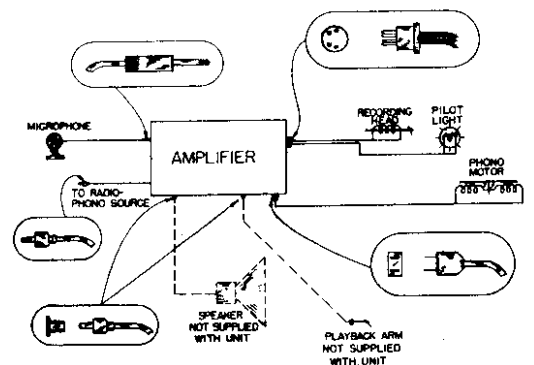
AMPLIFIER

Average required input levels (0 db = 6 MW across 500 ohms):
 Microphone jack -49 db
 Radio-phonograph cable + 3.2 db
 Power Source—117 volts AC, 60 cycles, 70 watts

RECORDER

Motor—4 pole synchronous type
 Recording head—Magnetic, impedance 3.2 ohms at 400 cycles
 Recording direction: Center to Outside
 Maximum time of recording (one side of disc):
 10"—5.0 Min.
 8"—3.5 Min.
 6"—2.0 Min.

BLOCK DIAGRAM



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TUBE COMPLEMENT

1	12SJ7	Mike Preamplifier	1	35L6GT	Power Output
1	12SQ7	First Audio Amplifier	1	50Y6GT	Rectifier
1	12SQ7	Second Audio Amplifier	1	6AB5/6N5	Volume Indicator

SOCKET VOLTAGES

Tube	Function	1	2	3	4	5	6	7	8
12SJ7	Preamp.	0	0*	10	0	10	25	11.8AC*	59
12SQ7	1st Audio	0	-.35	0	0	-.4	75	11.5AC*	11.5AC*
12SQ7	2nd Audio	0	0	1.2	0	0	105	11.5AC*	11.5AC*
35L6GT	Output	0	32AC*	200	130	0	NC	32AC	8
6AB5/6N5	Indicator	5.5AC*	20	-.2	110	0	5.5AC*	-	-
50Y6GT	Rectifier	NC	45AC*	0	125	125	NC	45AC*	235

*All AC heater voltages are measured between tube heater pins.
All voltages measured to chassis except as noted.
Line voltage 117 volts.
DC voltages measured with 20,000 ohm/volt meter.

AC voltages measured with 1000 ohm/volt meter.
All voltages DC except as noted.
Both volume controls in minimum position—no signal input.
Selector switch in "playback" position.

OPERATING INSTRUCTIONS

OPERATING THE RECORDER MECHANISM

Turn the ON-OFF switch on the radio to the ON position. This switch turns all of the equipment ON or OFF. Turn the RECORD RADIO-PHONO VOLUME switch on the recorder unit to the ON position. The recorder motor may now be started by turning the three-position switch on the recorder unit to either the RECORD or PLAYBACK position. To stop the recorder motor, place the switch in the STANDBY position.

DESCRIPTION OF OPERATING CONTROLS

A brief description of the various controls on the DrawERECORDER is given below. For location of these controls, see Figure 1.

1. VOL. INDICATOR. An eye type of indicator is used with this equipment. It enables the operator to maintain the proper volume level when recording either on radio or microphone.

CAUTION: NEVER RECORD SO THAT THE LOUDEST SOUNDS OVERLAP THE PATTERN ON THE VOLUME INDICATOR. IF THE RECORDING LEVEL IS TOO HIGH THE RECORDING WILL BE RUINED. See paragraph on RECORDING LEVEL INDICATOR.

2. RECORD-MICRO. PORT. PLAYBACK VOLUME. The microphone intensity is regulated by this control when using a microphone with the recorder. The microphone should be plugged into the jack marked MICROPHONE. This control is also used as a volume control during playback when the unit is used as a portable instrument.

3. RECORD RADIO-PHONO VOLUME. This control is used for adjusting the intensity of the program material to be recorded from the radio or phonograph.

4. SWITCH. The knob to the left is a three-position switch with the following functions:

a. STANDBY position—In standby position the amplifier tubes are heated and ready for immediate action, but the recorder is inoperative and the recorder motor is not running. This position is provided to enable the user to make an instantaneous recording of news flashes or other program material the user may wish to record at the spur of the moment.

b. PLAYBACK position—The switch should be in this position when playing back a recording if the recorder mechanism is equipped with a playback arm. The auxiliary playback arm is not supplied as standard equipment. If it is desired to install a playback arm on the recorder unit, see the paragraph on PORTABLE USE.

c. RECORD position—The switch should be placed in this position when making a recording.

MICROPHONE RECORDING

When recording with the microphone proceed as follows:

1. Plug the microphone into the MICROPHONE jack.
2. Place a recording blank on the turntable. Be sure the drive pin of the turntable is engaged in the drive pin hole of the recording blank.
3. Place the three-position switch in the RECORD position.
4. Adjust the RECORD-MICRO. PORT. PLAYBACK VOLUME control until the volume indicator almost closes when speaking into the microphone.
5. Move the recorder arm to the extreme left (toward the center of the recording blank) and lower the recording arm so that the needle starts cutting the blank. The recorder cuts from the inside to the outside, or opposite from a commercial record. This simplifies the problem of disposing of the thread.

6. After the recording has been started, make certain that the thread falls free of the cutting needle and toward the center of the record. It may be necessary to start the thread toward the center of the recording blank with the finger, but after a few revolutions of the turntable the thread will lie flat and no further attention will be required.
7. At the conclusion of the recording, cut a few blank grooves before lifting the recording head from the record.

RADIO RECORDING

When it is desired to record a radio program, follow the procedure given above for MICROPHONE RECORDING but use the RECORD RADIO-PHONO VOLUME control to regulate the intensity of the program material to be recorded instead of the microphone volume control. The program being recorded can be heard on the speaker during the recording process. This feature is provided so that the radio volume and recorder volume controls may be operated independently without any interaction. Similarly, the tone controls on the radio panel may be operated to obtain the most pleasing effects for the listener without affecting the quality of reproduction from the recorder.

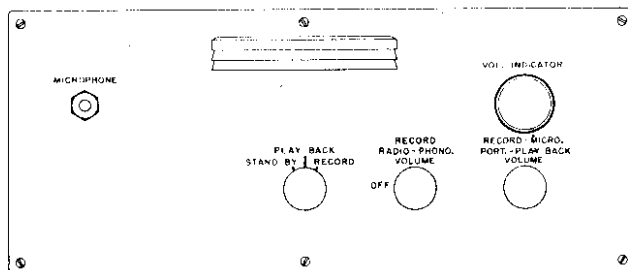


Fig. 1—HOFFMAN DRAWER RECORDER, PANEL VIEW
RECORDING MICROPHONE AND RADIO SIMULTANEOUSLY

If the RECORD RADIO-PHONO VOLUME control and the RECORD-MICRO PORT.-PLAYBACK VOLUME controls of the recorder are operated simultaneously, a combination recording of both radio and microphone may be obtained. When making this type of recording, the procedure described under RADIO RECORDING AND MICROPHONE RECORDING should be followed.

RECORDING PHONOGRAPH RECORDS

To make a copy of a phonograph record proceed as follows:

1. Place the switch on the radio panel in the PHONO position.
2. Turn the RECORD RADIO-PHONO VOLUME control to ON.
3. Start the record changer, which should be operated manually, and adjust the RECORD RADIO-PHONO VOLUME control on the DraweRECORDER until the volume indicating eye almost closes on the loudest sounds. The volume level is now properly adjusted to make the recording.

4. Place the recording blank on the recording turntable. Be sure the drive pin of the turntable is engaged in the drive pin hole of the recording blank.
5. With the record player motor running, place the record player arm on its rest.
6. Start the recorder motor by placing the three-position switch in the RECORD position.
7. Move the recorder arm to the extreme left (towards the center of the recording blank), and lower the recording arm so that the needle starts cutting the recording blank.
8. Place the record player arm on the first groove of the record to be recorded.
9. When the recording has played through, back off the RECORD RADIO-PHONO VOLUME control on the DraweRECORDER and remove the recording arm from the record.
10. Stop the record changer.

ADJUSTMENT OF THE CUTTING HEAD

The depth of cut which the cutting needle makes on the surface of the recording blank is adjusted by turning the thumb screw on the cutting arm. The thread left by the cutting needle should be about the size of a human hair. To determine if the depth of cut is correct proceed as follows.

1. Start the recorder and cut a few grooves in a recording blank.
2. Note the size of the thread.
3. Raise the recorder arm and remove the arm from the turntable.
4. If the thread is too large, turn the adjusting screw on the cutting arm towards the next lower number to decrease the pressure of the cutting head. Various makes of recording blanks may require different adjustments to produce the same size thread.

INSTALLATION OF THE CUTTING NEEDLE

Loosen the needle set screw at the front of the cutting head. Place the new needle in the hole in the bottom of the recording head, and make certain that the set screw is tightened against the flat side of the cutting needle. Lower the recording arm to the rest position.

PORTABLE USE

Chassis 133 recorder may be converted to independent portable operation as follows:

1. Select a standard single-hole-mount playback arm with a crystal cartridge capable of .5 to 1.0 volt output and mount the arm in the hole just behind and to the left of the turntable.

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2. Using a standard phono plug, attach the playback arm cable to the "playback" phono input receptacle. (See Figure 2.)
3. Using a second standard phono plug, attach a 3.2 ohm PM dynamic speaker to the "speaker" jack. (See Figure 2.)

RECORDING LEVEL INDICATOR

For proper recording level operation, the VOLUME indicator must be adjusted so that the eye just closes when approximately 1/2 watt of power is applied to the recording head. One-half watt of power produces good quality home recordings and allows a margin of safety to prevent overloading on high amplitude peaks. This recording level produces records with a playback level slightly lower than a commercial record, so that the volume control on a phonograph must be advanced farther than with a commercial record.

Use a constant 400 cycle source such as an audio oscillator for a reference signal. Connect the RADIO-PHONO INPUT wire to the signal source. Set the RECORD RADIO-PHONO VOLUME at about one-third of its clockwise rotation. Connect an AC voltmeter across the recording head. A convenient place to make this connection is from the ground to the white wire under the chassis at the recorder receptacle. Adjust the 400 cycle source output to produce 1.3 volts across the recording head. Approximately .5 volt signal input will be required. Set the VOLUME INDICATOR ADJUSTMENT, R26, located on the rear of the chassis, so that the tuning eye just begins to close with the 1.3 volt recording level.

The VOLUME INDICATOR is now adjusted so that proper recording level will be obtained from microphone or radio.

RECORDER MECHANISM

1. MAINTENANCE REPAIRS

Following is a list of symptoms and remedies for mechanical difficulties in the recorder mechanism.

- A. Mechanical rumble or "thump" (usually evidenced by a "moire" or "spoke" pattern in the recordings).
 1. Flat spots or dents in the drive wheel tire. Remove turntable and drive wheel and resurface the tire by clamping the wheel in a drill press and holding a sandpaper or emery block against the tire. If this treatment will not remedy the trouble, it may be necessary to replace the drive wheel. Even though a new wheel is installed, it still may be necessary to surface the tire as above.
 2. Dirt or foreign matter on the inner rim of the turntable. Remove table, and polish the inner rim with fine emery or crocus cloth.
 3. Faulty motor mount grommets. Replace.
 4. Bent motor shaft. Replace armature.
- B. Uneven groove spacing on recordings ("gathering").
 1. Dirt or foreign matter in the lead screw thread grooves. Clean the lead screw thoroughly with carbon tetrachloride and coat lightly with a good quality light grease.

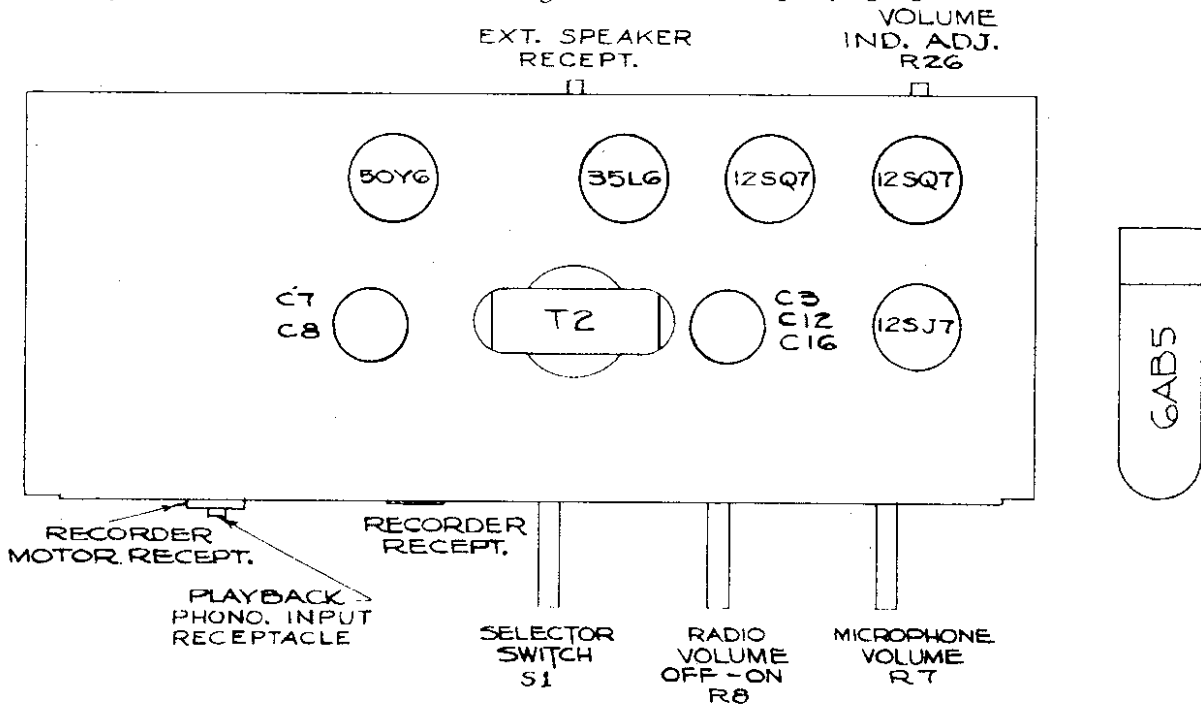


Fig. 2—TUBE LOCATION AND PARTS LAYOUT TOP VIEW CHASSIS 133

NEEDLE ANGLE ADJUSTMENT

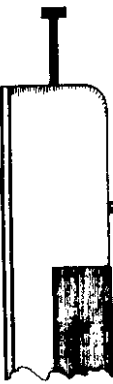


Fig 4—NEEDLE ANGLE

C. Lead screw follower engagement. The lead screw follower linkage is so designed that the follower should remain at 90° to the lead screw throughout the useful arc of travel of the recording arm. Adjustment of this angle is obtained by sliding the die-cast arm drive bar in or out in its socket at the base of the arm swivel. A set screw is provided to lock this adjustment in position. Maladjustment of the follower engagement will cause riding up of the follower and "gathering" in the recordings made on the machine.
Lead screw end play adjustment. This adjustment is a large set screw and lock nut at the spindle end of the lead screw. With the worm spindle drive assembly well lubricated, this adjustment should be set tight enough so that the end play in the lead screw is negligible, and yet not tight enough to cause binding. A practical way of accomplishing this is to tighten the large set screw until it seats against the end of the lead screw, then back it out about 3/4 of a turn, and lock in position.

2. MAINTENANCE ADJUSTMENT

- A. Groove depth. This adjustment is a knurled wheel located at the bottom of the recording arm. (See Figure 3.) Rotating the wheel in a clockwise direction increases the depth of cut, while counterclockwise rotation decreases it.

The ideal setting for depth of cut is one that will give the 60-40 groove land ratio. However, for practical purposes it is satisfactory to gauge the depth of cut by the size of the chip thread, which should be approximately that of a human hair. In gauging depth of cut adjustments, always use a fresh disc and a sharp cutting needle.

- B. Needle angle. This adjustment is a Phillips head screw located on the recording arm swivel post, just above the motor board. Clockwise rotation of this screw decreases the needle angle, while counterclockwise rotation increases it. The adjustment should be set so D. that the needle is at 90° to the recording disc surface. A convenient method of checking this is to set the needle on an uncut recording blank and set the adjustment so that the needle and its reflection form a straight line when viewed from the side. (See Figure 4.)

PARTS LIST

Symbol	Description	Hoffman Part No.
C1	25 Mf	4205
C2	.05 Mf	4100
C3, C12, C16	20/20/20 Mf	4200
C4, C14	100 Mmf	4000
C5, C11, C13	.02 Mf	4106
C6	50 Mf	4210
C7, C8	50/50 Mf	4208
C9	.005 Mf	4102
C10	.002 Mf	4118
C15	.01 Mf	4112
C17	.1 Mf	4111
C18	.05 Mf	4101

- 2. Lead screw follower "riding up" on the lead screw threads. See MAINTENANCE ADJUSTMENTS below for the remedy for this condition.

- 3. Bent lead screw or faulty spur gear on lead screw. Replace lead screw.

- C. "Wow" or uneven speed in recording.
 - 1. Oil or grease on rubber drive tire or on inner rim of turntable. Remove turntable and clean drive wheel and inner rim of table thoroughly with carbon tetrachloride.

- 2. Drive wheel engagement spring too weak. If adjustments will not correct, replace the spring.

CAUTION: If this spring is too strong, it will cause flats or dents to be formed in the rubber drive tire.

- 3. Disc center drive pin missing. Replace.

- 4. Faulty motor field. Replace motor.

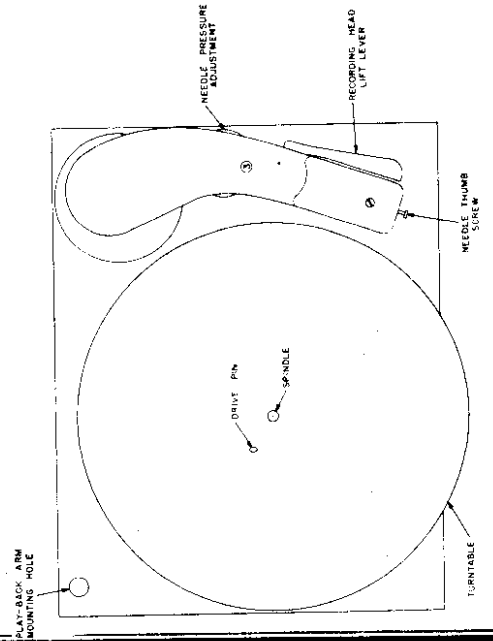
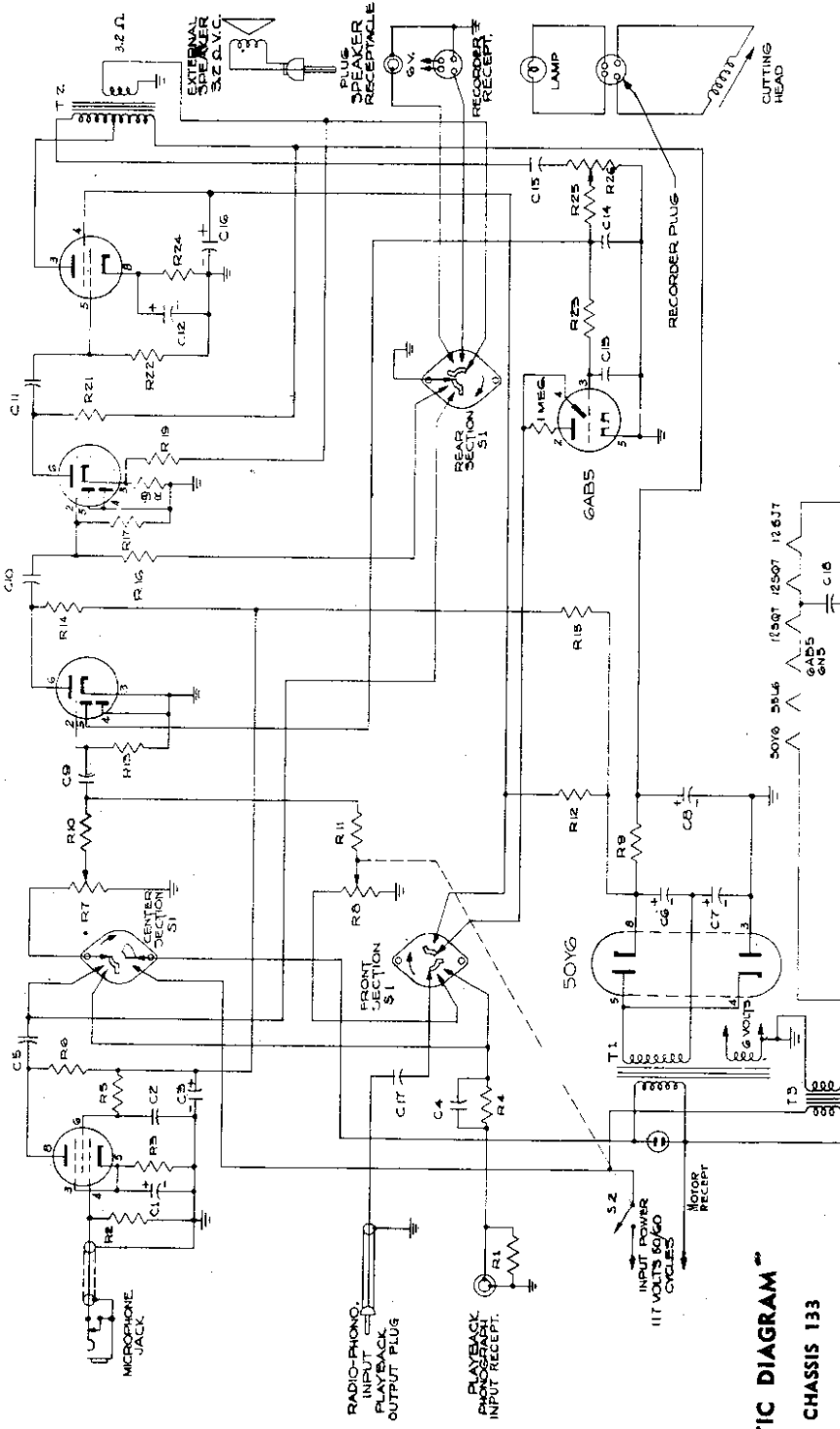


Fig. 3—RECORDER MECHANISM, TOP VIEW

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125J7 125Q7 35L6



SCHEMATIC DIAGRAM

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R1, R22	470,000 ohm	4506	T1	Power Transformer	5013
R2, R6, R10, R11, R14, R16, R21	220,000 ohm	4500	T2	Output Transformer	5111
R3	1200 ohm		T3	Isolation Transformer	5014
R4, R25	2.2 Meg.			Motor (General Industries No. 22700)	9512
R5, R17, R23	1 Meg.			Motor Bushing	1026
R7	500,000 ohm potentiometer			Motor Armature	9580
R8	500,000 ohm potentiometer with SPST Switch (S2)			Motor Grommets	3548
R9	470 ohm			Drive Wheel	9530
R12, R15	47,000 ohm			Drive Wheel Spring	9522
R13	4.7 Meg.			Lead Screw Assembly	9523
R18, R19	10,000 ohm			Recorder and Pilot Light Plug	9526
R24	220 ohm			Recording Disc Locating Pin	6207
R26	500,000 ohm potentiometer			Microphone	9014
S1	Selector Switch			Recording Head	9540
S2	SPST Power Switch (Part of R8)			Turntable Retaining Clip	9533
				Drive Wheel Retaining Clip	9531
				Turntable (General Industries No. 12761)	9527