MODEL B-40 AUTO RADIO

Type and Number of Radiotrons Used ..... 1 G.E.-89, 1 G.E.-78, 1 G.E.-6A7, 1 G.E.-6B7—Total, 4
Total Battery Current ..... 5.5 Amperes
Undistorted Output ..... 2.0 Watts
Loudspeaker Field Current ..... 1.35 Amperes
Maximum Output D.C. Voltage from Rectifier ..... 250 Volts
Total Plate Current ..... 53 M. A.

This four tube Superheterodyne Automobile Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, plate supply unit and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

Plate Supply Unit

This receiver uses a vibrator type Inverter and rectifier that provides a source of direct current voltage for use as plate and grid supply for all Radiotrons. *This unit is accurately adjusted at the factory and service adjustments should not be attempted.* Any difficulties with this unit should be referred to the nearest Distributor handling these instruments who has instructions for servicing this item.

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for either adjustments:

R. F. Adjustment

The three R. F. line-up capacitors are adjusted at 1400 K. C. Proceed as follows:

(a) A fairly accurate adjustment can be made by using the ear for an indicating device, thus eliminating the need of an output meter and the necessity of removing the rear cover to connect it.

(b) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(d) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(e) Then adjust the three line-up capacitors until maximum sound in the speaker is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

For a more accurate adjustment, the use of an output meter is recommended. However, this will require the removal of the rear cover in order to connect the output meter across the cone coil. Also the bottom and Radiotron side of the chassis must be shielded together with the transformer so that the vibrator noise will not be obtained, due to the removal of the case shielding.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33⅞" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

RADIOTRON SOCKET VOLTAGES

6.3 Voltage Battery

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Plate Current M. A.	Heater Volts
Type-78 R. F.		3.7	92	253	7.0	6.06
Type-6A7	First Detector	3.7	92	253	12.0 Total	6.06
	Oscillator	0	—	253		
Type-6B7 Second Detector		3.2	92	236	6.0	6.06
Type-89 Power		26.5	230	217	27.5	6.06

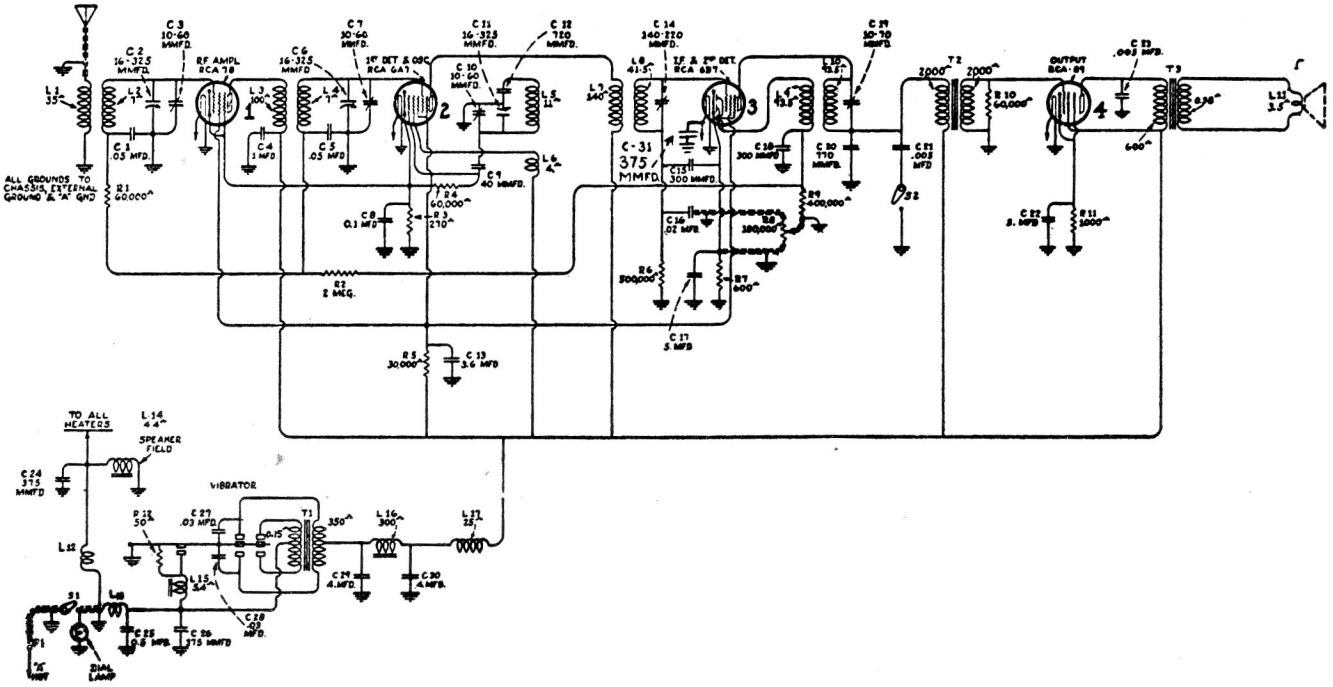


Figure A—Schematic Diagram

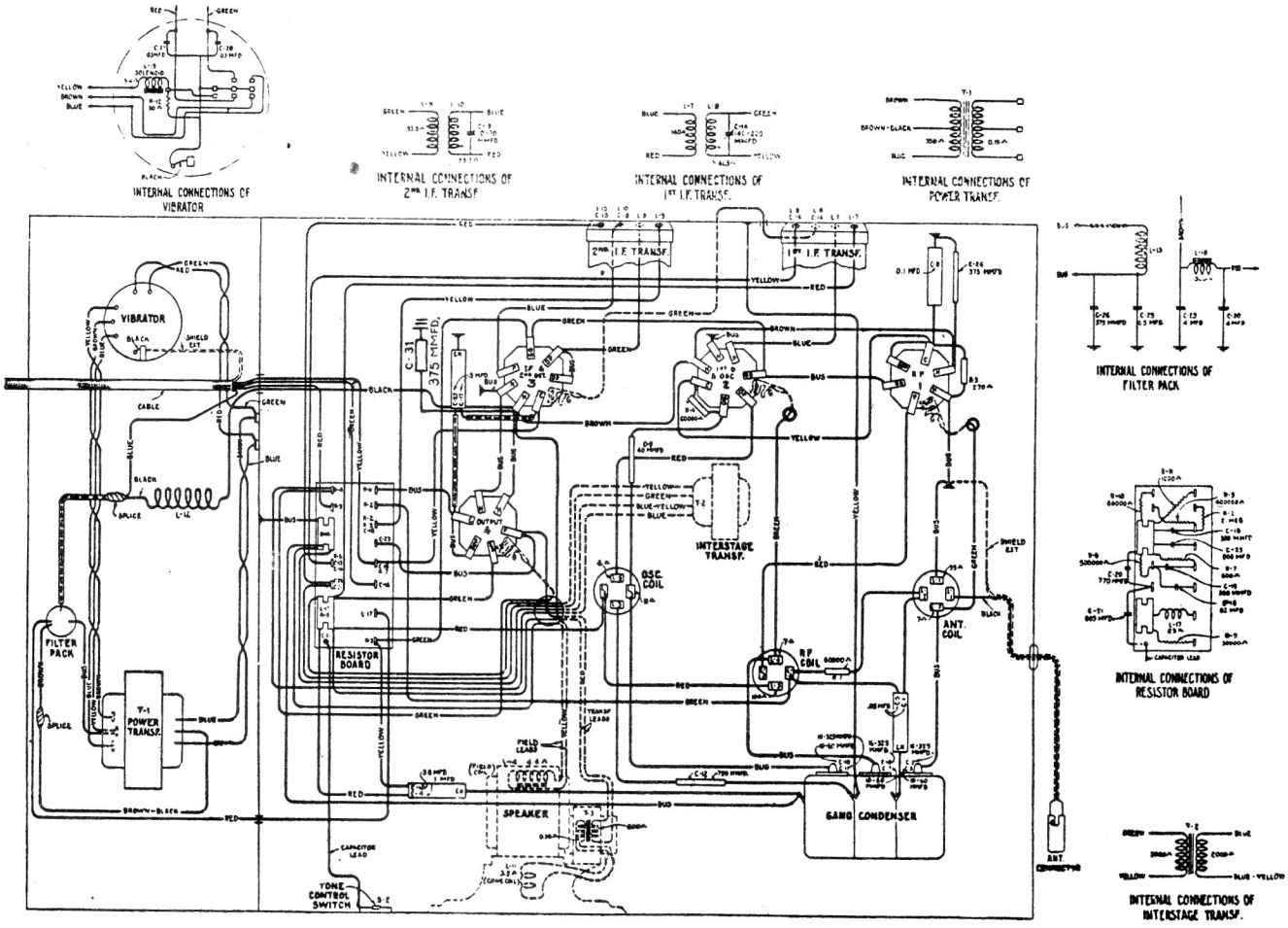


Figure B—Wiring Diagram

SERVICE DATA FOR VIBRATOR UNIT

The vibrator unit used in this receiver is of excellent design and sturdy construction. It functions as a combined A. C. generator and mechanical rectifier. Referring to Figure C, it will be noted that the primary and secondary of the transformer are center tapped. By connecting the outside of each winding to the contacts of the vibrator and using the arms and center taps of the windings as sources of input and output voltage, a combined generating and rectifying action is obtained.

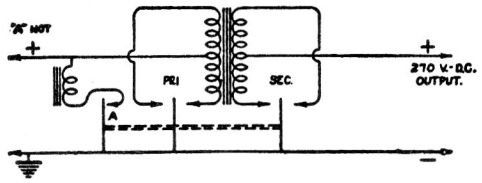


Figure C—Schematic of Vibrator Unit

When the switch is turned "on" the vibrator makes and breaks contact at point "A." This constitutes the driving action of the unit, and is in no way connected with the other circuits. The primary vibrator functions to connect the input low voltage current first across one-half and then across the other half of the primary of the transformer. This results in a pulsating direct current applied to the primary in an alternating direction. The result is an A. C. voltage emanating from the secondary of the transformer; as the transformer has a step-up ratio the A. C. secondary voltage is considerably greater than the primary. The secondary vibrator functions in a similar manner as that on the primary side, so that by reversing the alternations applied to the load, a pulsating D. C. is obtained. After filtering, this is used as plate and grid supply to all Radiotrons.

(1) Spring and Contact Adjustments Limits.

Proper adjustments of the various contacts are made in the following order and manner:

1. With 8 and 10, Figure D, firmly held against their respective stops and with 3 and 5 in contact with 8 and 10 respectively, the air gap between 1, 6 and 2, 7 shall be 0.015" plus or minus 0.005". On no particular unit however, shall the differences between the two air gaps exceed 0.005".

2. Adjust the buzzer screw, 11, Figure D, so that when the position of the armature is such that 1 and 2 are just making contact with 6 and 7 respectively, the contact between 4 and 9 shall just be breaking.

(2) Adjustment for the Reduction of Sparking.

If any pair of contacts show excessive sparking, the following procedure will in general reduce the sparking to a minimum.

For example, consider the case where excessive sparking is occurring between 6 and 1. Sparking will be reduced to a minimum by bending the armature spring on that side (secondary side) away from 6 and toward 8. (See Figure D.) If the bend is too small, only a small change will be noted. However, if an excessive bend is made, the sparking will be transferred from 6, 1 to 8, 3.

The same method may be applied to any pair of contacts. Usually only a slight bend will be necessary. Although after bending, no change in the position of the armature contacts may be noted, a sufficient change in the initial force requirements will have been made to reduce sparking.

(3) Output Voltage.

When connected to a 6 volt primary source, the output voltage across a 5,000 ohm resistor (connected in place of the receiver load at the output of the filter), must be 230 volts or greater.

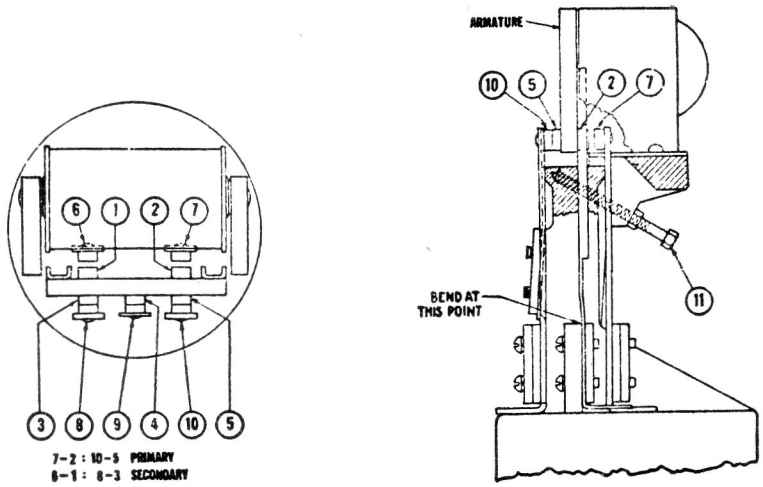
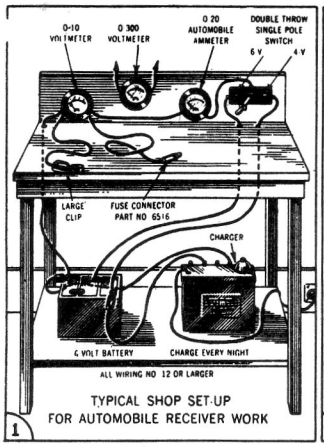


Figure D—Vibrator Contacts

REPLACEMENT PARTS—MODEL B-40

Key No.	Stock No.	DESCRIPTION
		RECEIVER ASSEMBLIES
R-5	2240	Resistor—30,000 ohms—Carbon type—1 watt
R-11	2816	Resistor—1,000 ohms—Carbon type—1 watt
R-7	3218	Resistor—600 ohms—Carbon type—¼ watt
	3572	Socket—Radiotron 7 contact socket
R-1, R-4, R-10	3602	Resistor—60,000 ohms—Carbon type—¼ watt
C-15	3616	Capacitor—300 mmfd
C-23, C-21	3617	Capacitor—0.005 mfd
C-16	3639	Capacitor—0.02 mfd
R-9	3619	Resistor—400,000 ohms—Carbon type—¼ watt
	3621	Coil—Choke coil—Located on resistor board
	3636	Transformer—1st intermediate frequency transformer
	3637	Transformer—2nd intermediate frequency transformer
C-8	3641	Capacitor—0.1 mfd
	3644	Bracket—Condenser drive bracket and roller
	S-1316	Knob—Tone control knob
C-24	3695	Capacitor—375 mmfd
C-9	3696	Capacitor—40 mmfd
C-12	3699	Capacitor—720 mmfd
R-3	6135	Resistor—270 ohms—Carbon type—¼ watt
R-6	S-1067	Resistor—500,000 ohms—Carbon type—¼ watt
	S-1029	Spring—Tuning condenser drive cord tension spring
R-2	6242	Resistor—2 megohms—Carbon type—¼ watt
	S-1271	Cord—Tuning condenser drive cord
	6471	Coil—Oscillator coil assembly
	S-1312	Coil—R. F. coil assembly
T-2	6488	Transformer—Interstage audio transformer
	6470	Coil—Antenna coil, less shield
S-2	6490	Tone control switch
C-4, C-13	6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitors
	6493	Drum—Tuning condenser drive drum
C-22, C-17	6513	Capacitor—Comprising two 5.0 mfd. capacitors
C-1, C-5	6514	Capacitor—Comprising two 0.05 mfd. capacitors
	6515	Cable—Shielded cable with antenna connector
	6516	Connector—Fuse connector
	6517	Cable—Main cable complete with fuse connector
	S-1151	Socket—Radiotron 6 contact socket
	7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd., and one 375 mmfd. capacitors
	7601	Condenser—3 gang variable tuning condenser
T-1	9430	Transformer—Power transformer
		CONTROL BOX ASSEMBLIES
	3649	Key—Volume control and switch key
	3650	Screw—Self locking No. 10-32-$\frac{1}{8}$" fulldog point set screw
	3651	Screw—Self locking No. 10-32-$\frac{1}{8}$" cupped point set screw
	3652	Screw—Self locking No. 10-32-¼" cupped point set screw—For flexible drive shaft
	3690	Strap and bracket assembly—Comprising one bracket, two screws, one lock washer and one strap
	6161	Knob—Station selector knob
	6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24⅞" long
	6497	Shaft—Flexible drive shaft complete with connectors — Standard length — Approximately 33⅞" long
R-8	6499	Volume control—Combination volume control and switch
	6500	Nut—Volume control and switch lock nut
	6501	Scale—Dial scale
	6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12⅞" long
	6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18⅞" long
	7602	Box—Control box complete
	7603	Cover—Control box cover
		MISCELLANEOUS PARTS
F-1	3646	Fuse—20 amperes
	3647	Nut—Cap nut and lock washer
	3648	Screw—No. 10-32-$\frac{1}{8}$" cap screw and lock washer
	3689	Bracket—Receiver mounting bracket, bolt and nut assembly
	S-1201	Suppressor—Spark plug suppressor
	S-1182	Suppressor—Distributor suppressor
	6494	Capacitor—Ammeter capacitor—0.5 mfd.
	6495	Capacitor—Generator capacitor—0.5 mfd.
		VIBRATOR ASSEMBLIES
	3611	Spring—Buzzer spring and contact point
	3612	Screw—Buzzer adjustment screw and nut
	3613	Spring—Main contact spring and contact point
R-12	3614	Resistor—50 ohms—Carbon type—½ watt
	6478	Armature assembly—Comprising armature, contacts and springs—Assembled
L-15	6479	Coil—Vibrator coil assembly
	6480	Capacitor and base assembly—Comprising vibrator base and two 0.03 mfd. capacitors
	6481	Shield—Outer shield for vibrator assembly
	6482	Shield—Inner shield for vibrator assembly
	7604	Vibrator—Vibrator assembly complete
		REPRODUCER ASSEMBLIES
T-3	3688	Transformer—Output transformer
	7607	Screen—Metal screen
	7608	Coil assembly—Comprising field coil, magnet and cone support
	S-1314	Cone—Reproducer cone complete

MODEL B-40 RADIO



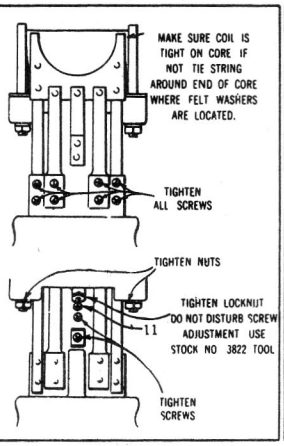
TYPICAL SHOP SET-UP FOR AUTOMOBILE RECEIVER WORK

1

PROCURE TOOLS SHOWN

STOCK No. 3823

2



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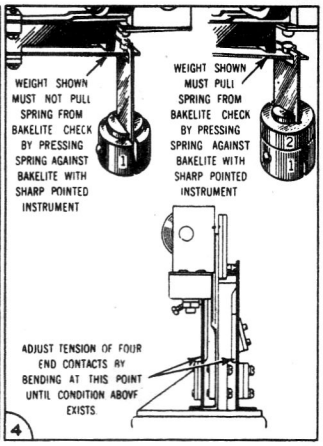

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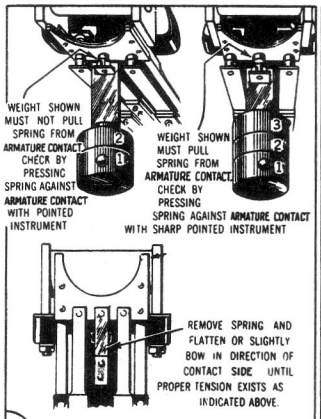

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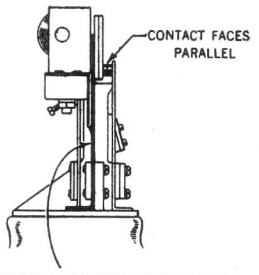
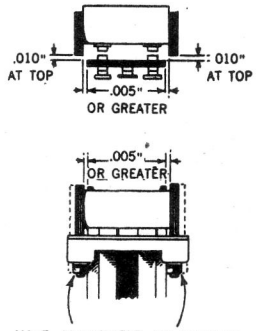


CHECK ALIGNMENT OF ARMATURE SUPPORT AVOID BOW AND ADJUST SO CONTACT FACES ARE PARALLEL

REFER TO "DETAILS OF PROPER METHOD OF ADJUSTING VIBRATOR ARMATURE" FOR THIS ADJUSTMENT

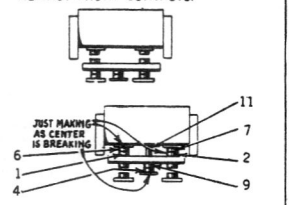
6



MAKE ADJUSTMENT BY SLIGHTLY LOOSENING SCREWS AND ADJUST POSITION OF COIL BY TAPPING.

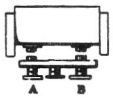
7

NORMAL POSITION OF ARMATURE. TENSION SHOULD BE SAME ON BOTH SIDES, ARMATURE LIGHTLY TOUCHING AGAINST FRONT CONTACTS.



ADJUST BUZZER SCREW 11, SO THAT WHEN POSITION OF THE ARMATURE IS SUCH THAT 1 AND 2 ARE JUST MAKING CONTACT WITH 6 AND 7 RESPECTIVELY, THE CONTACT BETWEEN 4 AND 9 SHALL BE JUST BREAKING.

8



A NORMAL CONDITION OF SPARKING IS WHEN THE SLIGHT SPARKING AT EACH PAIR OF "A" CONTACTS IS EQUAL

ALSO THE SLIGHT SPARKING AT EACH PAIR OF "B" CONTACTS MUST BE EQUAL.

HOWEVER, "A" WILL NOT EQUALIZE "B" AND NO ATTEMPT SHOULD BE MADE FOR SUCH A CONDITION, EACH PAIR BEING ADJUSTED IN DEPENDENTLY.

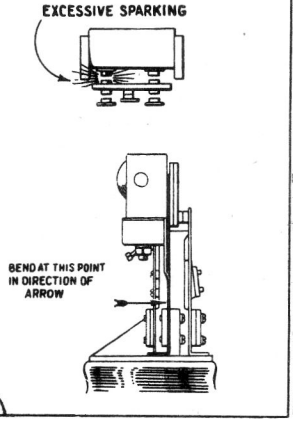
NORMAL SPARKING IS VERY SLIGHT.

9

VIOLENT SPARKING AT ALL CONTACTS THAT REDUCES AFTER ABOUT ONE MINUTE OF OPERATION, INDICATES LOW VALUE CAPACITORS C 27 AND C 28

THIS CONDITION IS REMEDIED BY REPLACING THE VIBRATOR BASE WHICH CONTAINS THESE CAPACITORS.

10



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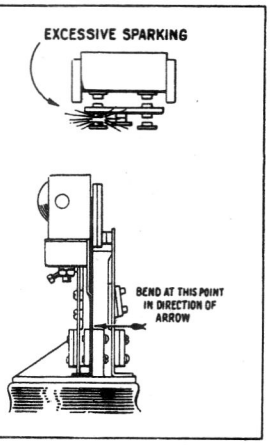

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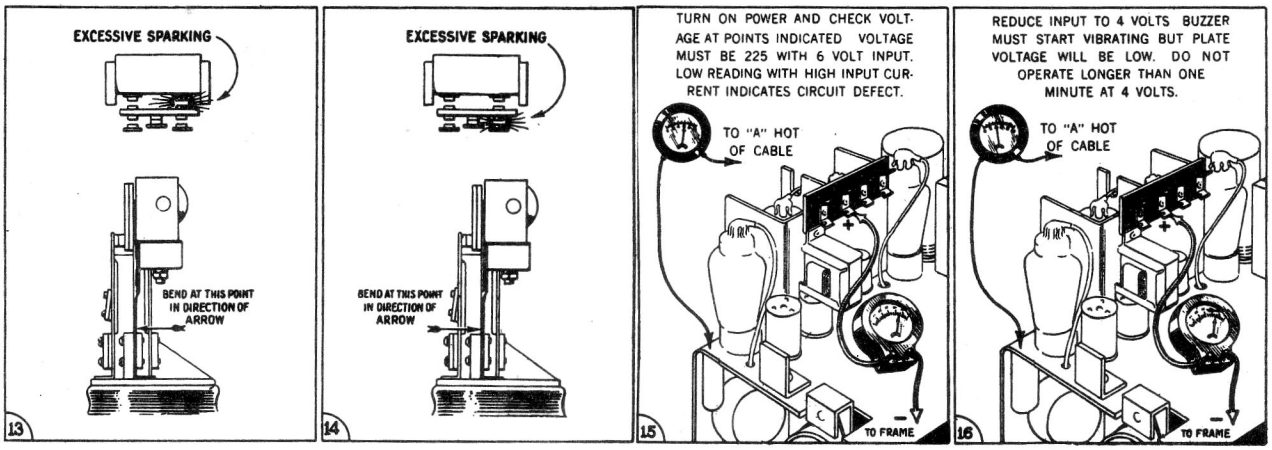
MODEL B-40 RADIO



DETAILS OF PROPER METHOD OF ADJUSTING VIBRATOR ARMATURE

Check all adjustments as shown regardless of point where sparking occurs. The bending tool stock No. 3822 can be used to advantage for adjustments 19 and 20.

The arrows indicate direction of forces