RADIO CORPORATION PTY. LTD.

21 STURT STREET, SOUTH MELBOURNE.

AUTO RADIO SERVICE BULLETIN.

SUBJECT - ENGINE INTERFERENCE ELIMINATION:

Antennas in cars are necessarily small and are the only means of receiving the electrical impulses or radio waves transmitted from a broadcasting station. Therefore, if satisfactory reception is to be obtained, it becomes necessary to design a car receiver of considerable sensitivity, to compensate for the limited size of the receiving antenna.

This high degree of sensitivity naturally causes, to some extent, other impulses to be received, the most objectionable being interference radiated from the ignition system of the car.

On the majority of cars this interference from the ignition system is eliminated by the use of standard spark plug and coil resistors, ignition coil condenser, and generator condenser furnished with the receiver. The amount of interference will vary on different types of automobiles, and it will be necessary on some installations to use additional methods of interference elimination.

Modern receivers use automatic volume control, which increases the sensitivity of the receiver when a weak signal is being received, When no broadcast signal is being received, or, between station, the sensitivity of the receiver is at its maximum, and a slight amount of interference from the engine may be heard on some makes of automobiles. Then, as soon as a broadcasting station is turned in, the strength of the broadcast signal automatically causes the automatic volume control tube to decrease the sensitivity of radio receiver. Therefore, engine interference tests should be made with the volume control of the set turned on full and the station selector turned between stations.

CAUSES OF INTERFERENCE.

There are four general types of interference which may be described in the following manner.

1. Generator Hum.
2. Primary (low tension) Ignition Circuit Interference
3. Secondary (high tension) Ignition Circuit Interference

NOTE: The interference set up by any one of the above may be radiated by the wiring to the dome light, head lights, tail light, stop light, horn or ignition switch. Varying degrees of success may be had in eliminating the interference by by-passing these various circuits. However, it is desirable to eliminate the interference at its source wherever possible.

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4. Interference from external electrical disturbances from high power lines, or electrical devices, sometimes characteristic of certain localities only. These do not fall under the above classifications, and cannot be corrected by any receiver applications or remedies.

STANDARD INTERFERENCE ELIMINATION.

1. Spark Plug Resistors: (See Fig. 1.)

Securely mount a spark plug resistor on each spark plug and connect the spark plug wires to the other end of the resistors.

The standard spark plug resistors Part No. A1006 are designed so that they may be mounted in either a horizontal or vertical position. Place them in a horizontal position wherever possible.

Use the special screw-in-type resistor, Part No. A1007, where the location of plugs in the engine block will not permit the use of standard resistors. (Nash, Buick and Franklin are examples requiring special resistors). In using this screw type resistor, always locate it as close to the spark plug as possible.

2. DISTRIBUTOR RESISTOR: (See Fig. 2.)

Remove high tension lead from center socket of distributor cap. Plug the split end of resistor into this socket as far as it will go. Make sure this is a good fit. Connect the high tension lead to the other end of the resistor. Where it is impossible to install the resistor on the distributor cap, it may be inserted in the high tension socket at the coil, or directly in series with the high tension lead, by use of the screw-in type resistor, keeping the resistor as close to the distributor end of the lead as possible.

3. GENERATOR CONDENSER: (See Fig. 4.)

Install a generator condenser, Part No. A1009 on the generator at the cutout relay. Connect the lead of the condenser to the generator terminal of the cutout relay. The other side of the condenser is grounded to the condenser case which forms the other contact to the car at the point where the condenser bracket is mounted under the cutout relay bracket.

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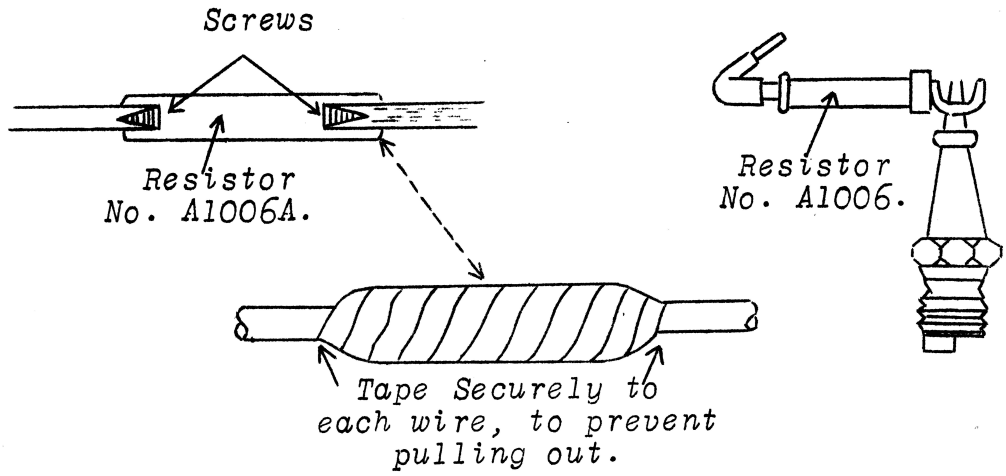


FIG. 1.

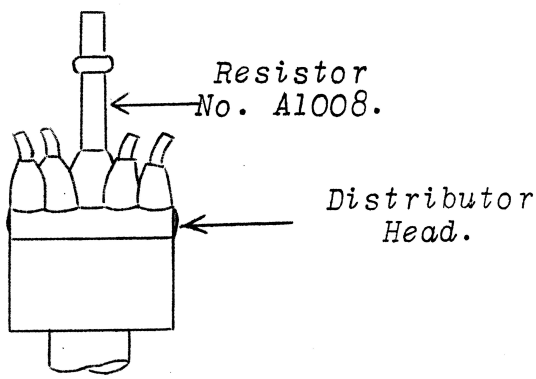
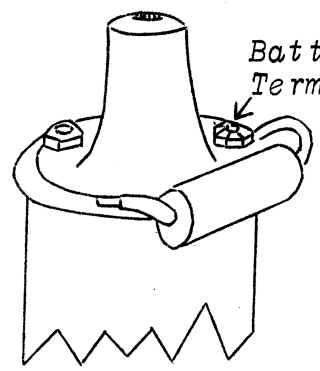


FIG. 2.



Solder this lead to brass rim. If coil has no metal rim, solder to metal can or metal coil base.

FIG. 3.

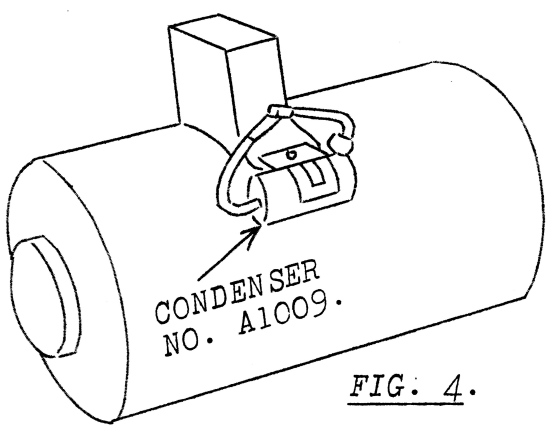


FIG. 4.

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4. IGNITION COIL CONDENSER: (See Fig. 3.)

Solder an ignition condenser, Part No. 1009, securely in position to the rim of the coil. Clean surface at point of contact, in order to secure a good ground. This places a condenser from the battery side of the ignition coil to ground. If coil is of type which has no metal rim at terminal end, solder condenser lead to metal can, or to metal mounting bracket. Keep lead as short as possible.

5. SHIELDED LEAD-IN:

Most receivers are factory equipped with shielded lead-in to prevent pick up of interference at that point. The shielded lead-in should run the entire length of the exposed portion of the antenna lead-in wire. Run this lead as direct as possible.

CAUTION: Do not use shielded lead-in other than the type furnished with the receiver, as it will result in a decrease in the effectiveness of the antenna.

6. BONDING:

Bonding is the process of establishing a good electrical connection between the various metal rods, tubes, etc., and the dash or engine block.

Using braided wire, bond to the dash all oil pipes or rods passing through the dash. Solder one end of the braided wire to these pipes, etc., and fasten the other end to the engine side of the dash with a self-tapping screw, Part No.709, so as to insure the best possible connection. See Fig. 5.

The same braided wire may be used for bonding the copper tubing employed for connecting the windshield wiper to the intake manifold. In most cars, this copper tubing is in two sections, connected by a rubber hose under the cowling, and the mechanic often times overlooks the section leading from the cowling to the top of the windshield. In some cases, this had been found to be the source of the worst interference, and by grounding it thoroughly to the instrument panel or the dash of the car, all interference was eliminated.

CAUTION: When bonding, follow Fig. 5 very closely and keep braid as short as possible. This is important.

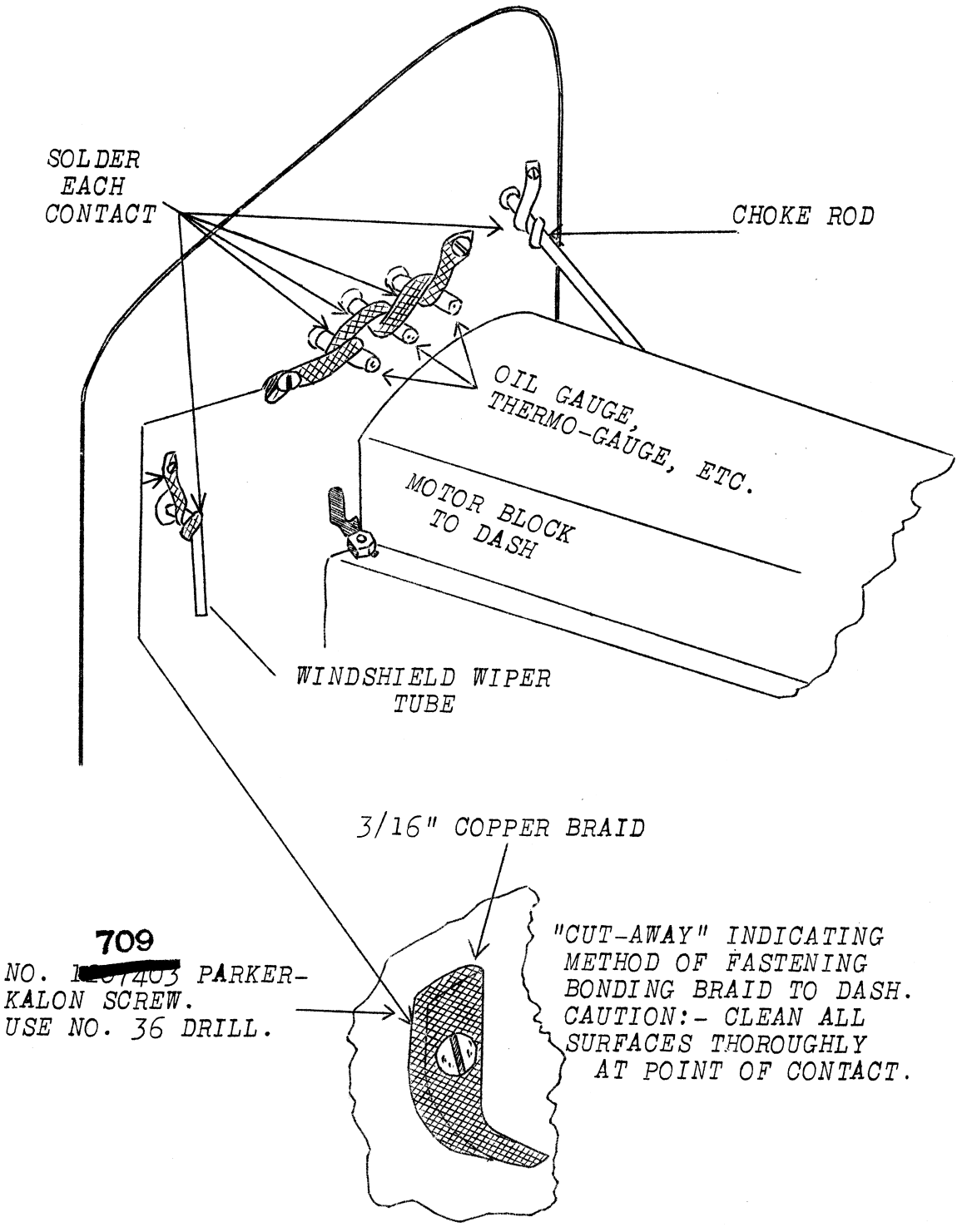
SOLDER EACH CONTACT
CHOKE ROD
OIL GAUGE, THERMO-GAUGE, ETC.
MOTOR BLOCK TO DASH
WINDSHIELD WIPER TUBE
3/16" COPPER BRAID
709
NO. [redacted]403 PARKER-KALON SCREW.
USE NO. 36 DRILL.
"CUT-AWAY" INDICATING METHOD OF FASTENING BONDING BRAID TO DASH.
CAUTION:- CLEAN ALL SURFACES THOROUGHLY AT POINT OF CONTACT.

FIG. 5.

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ADDITIONAL INTERFERENCE ELIMINATION.

On exceptional installations where the procedure outlined above does not reduce the interference to a satisfactory degree, proceed as follows:-

1. Connect a condenser, Part No.A1009 from: ammeter to ground, or ignition switch to ground. (Use as short a lead as possible on the condenser.

2. Determine whether noise enters set through antenna by disconnecting the antenna lead-in from the receiver while the motor is running, and noting the effect on spark interference.

   If the interference is reduced or eliminated, it may be concluded that it is being picked up by the antenna. To determine which wires are radiating the interference to the antenna, test each of the following items to locate the one which is causing the interference.

   (a) Dome light wiring
   (b) Head light or tail light wiring
   (c) Horn wiring
   (d) Electric clock wiring
   (e) Generator and starter wiring

(To do this, obtain a by-pass condenser, Part No. A1009, and connect one lead of the condenser to the hot side of the suspected unit and connect the condenser case or other lead to a good ground on the metal part of the car body or frame. In the majority of cases, this procedure will indicate where the trouble lies. After it is found, mount the condenser permanently and solder the leads in the proper location. DO NOT solder to rear of instrument panel, as the heat from the iron may blister the paint.

If the interference continues with the antenna disconnected from the chassis, it is an indication that the interference is coming from the ignition circuit, and being led into the radio set through the radio wiring.

3. THE GENERATOR.

In order to determine whether the generator is causing any noise in the radio reception, accelerate the engine and cut off the switch. Then, if a whine, decreasing in volume as the engine stops, is noticed, the generator is causing interference. If cleaning the commutator does not remedy this another condenser should be installed from the generator side of the cutout to a good ground on the frame of the generator.

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On the other hand, if no noise is noticed immediately when the switch is turned off, you can be reasonably sure that the generator is not causing any interference.

4. The next step is to determine whether the interference is caused by the primary or the secondary circuit of the ignition system. To do this, disconnect the high tension wire from both the ignition coil and the distributor. This wire runs from the center of the ignition coil to the center of the distributor. Turn the ignition switch on and turn the motor with crank, and listen for ignition clicks in the speaker. If no clicks are heard, you may be reasonably sure that the interference is caused by the secondary ignition circuit, and the suggestion listed under "Secondary (high tension) Ignition Circuit" should be tried.

However, if the clicks are heard, you may be sure that a part of the interference is caused by the primary ignition circuit, and the suggestions listed under "Primary (low tension) Ignition Circuit" should be tried. However, some of the interference may still be due to the secondary and the suggestions listed in "Secondary Ignition Circuit" should also be followed.

5. SECONDARY (HIGH TENSION) IGNITION CIRCUIT.

Having located the source of the ignition interference in the secondary circuit with the instructions under paragraph 4 proceed as follows:-

CAUTION: Method outlined in the following paragraphs should only be used as a last resort when other methods have failed.

Move the ignition coil from the instrument panel to the engine compartment, mounting it on the engine block somewhere in close proximity to the distributor, or, as far away from the dash as is practical. In mounting the coil, a good ground should be maintained between the coil mounting bracket and the engine block. New primary wires will be required after moving the coil and these should be made of shielded #14 low tension ignition cable --- important --- run these along frame channel where possible.

6. PRIMARY (LOW TENSION) IGNITION CIRCUIT.

Having located the source of the interference in the primary circuit, in accordance with the instructions under paragraph 4, proceed as follows:-

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(a) Install shielded wiring from the ignition coil to the ignition switch on the instrument panel, and also, from the ignition coil to the distributor head. Ground these shielded wires.

(b) In case the plug wires should be longer than necessary, shorten these wires as much as possible. Separate the "High Tension Lead" from the "Primary Wires". Keep this lead as far away from the High Tension Lead as is possible.

7. PEENING ROTOR ARM.

After you have tried all the preceding methods, as outlined, and have failed to materially reduce the ignition interference, we offer the following method which should only be used as a last resort:

Reduce the gap between the rotor arm and the fixed contacts in the distributor cap. This operation requires the utmost care. (We would advise having the job done by an expert electrical mechanic.) Remove the cap and cover the fixed contacts with chalk. Remove the rotor and lengthen the arm, by careful peening, about .005", then replace in the distributor and put on the cap. Turn the engine over by hand a few times, remove the cap and examine for indications of contact on the chalk marks. Repeat this operation until there is evidence of the rotor arm touching the fixed contacts, file off about .002" and re-assemble. Start the engine and run for a minute then re-examine the cap. If there is evidence that the rotor arm is still touching the fixed contacts, file off another thousandth (.001), and recheck.

8. MISCELLANEOUS.

The entire ignition system must be checked and put in perfect condition, including the distributor rotor and contact points generator brushes, spark plugs and all light wiring, starting motor cable, generator cable, dash wiring and stop-light switch. Examine for loose connections or leaky high tension cable in the ignition system of the car.

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In assembling automobiles, oftentimes paint, or the like, prevents a good ground connection being made between the various metal parts of the car which form the ground circuit. These poor connections are not apparent from the standpoint of the operation of the car, as the voltage applied across the connections from the battery is enough to make a sufficiently good contact for that purpose. However, when a radio receiver is installed on a car, it is particularly desirable to maintain all the metal parts of the car at the same ground potential so that no radiation of spark interference will flow from the engine block to the dash, thence to the frame of the car for example, in order to reach the lowest ground potential. Bonding all of the oil pipes, cables, etc., on the engine side of the dash tends to prevent radiation from the ignition circuit entering the radio set compartment under the cowl. Once the cause of interference is understood, it is fairly easy to trace it to its source and to take the necessary steps for eliminating it.

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SUBJECT - DOME LIGHT FILTER - PART NO. A1018.

In some auto radio installation, it will be found that the antenna pick-up is objectionable due to the interference being carried up the dome light wiring to the antenna, from the ammeter.

To provide for these exceptional cases, we have made available a filter arrangement, easy to install, and very effective in filtering out this type of interference. See Fig. 1 for method of installation.
