ACCESSORIES

CONTENTS OF THIS SECTION

DELUXE ELECTRAMATIC RADIO GENERAL DESCRIPTION

The Deluxe Electramatic Radio is equipped with a "selector bar" and five push buttons to provide automatic tuning of all available stations in any locality. The push buttons are preset to the owners favorite stations while the selector bar provides tuning to all stations transmitting in the area. Two control knobs flank the radio dial. The left hand knob is the on-off switch and volume control. The tone control is mounted behind the left knob. The right knob is the manual tuner. Behind the manual tuning knob is a three position "sensitivity" control that limits signal strength. When the control is moved full counter-clockwise only the strongest stations are picked up by the selector bar. Movement of the sensitivity control in a clockwise direction to the second and third positions will simply increase the signal pick up ability of the selector bar to all listenable stations.

Antenna height controls automatic station selection similarly to the sensitivity control. If the station indicator sweeps the dial repeatedly without stopping, the antenna should be raised to help strengthen the broadcasting signal before any service work is attempted.

SERVICE INFORMATION

SETTING PUSH BUTTONS

Setting of the five push buttons is accomplished as follows: Manually select desired station starting at low end of dial and adjust for peak reception. Pull open door above push buttons and line up one of the five red tabs with the station indicator (starting with left hand tab). By repeating this process five stations will be preset to push button operation. Where two stations operate at close to the same frequency it may be necessary to offset the tabs slightly to assure selection of the station desired.

In support of the civil defense program, both Pontiac radios feature the "civil defense marking" (black circle and white triangle) at the CONELRAD frequencies of 640 and 1240 kilocycles.

ANTENNA TRIMMER ADJUSTMENT

In order to make the antenna trimmer adjustment, the car should be outdoors and as far removed from electrical disturbances as possible. Extend the antenna to its full height. Tune in a weak station between 600 and 1000 kilocycles where it is possible to turn the volume control full on. This is necessary in

order to offset the action of the automatic volume control. Using a screw driver inserted through the hole in the top of the glove box, turn the trimmer adjusting screw clockwise until the station fades out. Turn the screw counterclockwise until the station peaks in volume and starts to fade. Then adjust the trimmer screw between these two extremes for maximum volume. NOTE: The trimmer screw, on a few of the first production sets, is located on the right side of the tuner unit. It can be reached using a long screw driver and working along the right end of the glove compartment.

Antenna trimmer adjustment should be made on new car pre-delivery inspection and also after a set has been removed from the car and worked on by a radio repair man. The reason for trimming the antenna after service work has been performed is that the radio repair man will undoubtedly have adjusted the trimmer to match his antenna so that it no longer matches the antenna in the car from which it was removed. Trimming the antenna is especially important with the deluxe electramatic radio inasmuch as this will directly affect the sensitivity control of the selector bar.

REMOVING AND REPLACING ELECTRAMATIC RADIO

The tuner is retained by the nuts located under the control knobs, and by a brace attached to the left side. In order to remove the tuner unit, it is first necessary to remove the glove compartment box.

The audio-power unit is retained at the front by two screws through the flange of the instrument panel and at the rear by a bracket attached to the underside of the cowl.

DELUXE RADIO GENERAL DESCRIPTION

The deluxe radio is a superheterodyne set using five low voltage type tubes and a transistor audio output stage. Power is supplied directly from the car storage battery to the tube filaments, screens, and plates. The low voltage design eliminates the need for vibrator, transformer, and rectifier formerly used. The characteristic buzzing noise generally associated with normal vibrator action will not be heard with this set.

The controls consist of manual tuning, push button tuning, on-off and volume control, and tone control.

SERVICE INFORMATION

SETTING PUSH BUTTONS

1. Turn the receiver on and let it play for ten or fifteen minutes so all metal parts expand to operating temperature.

2. Select the push button to be adjusted and pull it to the right and out, as far as it will go.

3. Tune in the desired station with the manual tuning knob.

4. Push the push button all the way in and release. The push button is now set up.

ANTENNA TRIMMER ADJUSTMENT

The antenna trimmer information for the Deluxe Electramatic radio applies also to the Deluxe radio. The trimmer screw is accessible through a hole in the top of the glove box.

REMOVING AND REPLACING THE DELUXE RADIO

NOTE: In the event that the radio requires service, both the radio and the speaker should be removed and sent to an authorized service station.

The radio receiver is attached to the instrument panel by a nut under each control knob and a brace fastened to the left side of the receiver. In order to remove the radio it is first necessary to remove the glove compartment box. CAUTION: *Never turn the radio on with the speaker disconnected since this may damage the transistor.*

MOTOR OPERATED ANTENNA — SEMI-AUTOMATIC

OPERATION

The electric antenna operating switch is located under the instrument panel. To raise antenna, pull switch lever to rear; to lower, push switch lever forward. When lever is released it returns automatically to the "Off" position. The antenna can be raised or lowered to any intermediate height by releasing switch lever when desired position is reached. CAUTION: *Do not hold switch in operating position beyond full travel of antenna (up or down) any longer than necessary to make sure antenna has reached the end of its travel. Such practice would result in motor overload and excessive wear of the drive mechanism.*

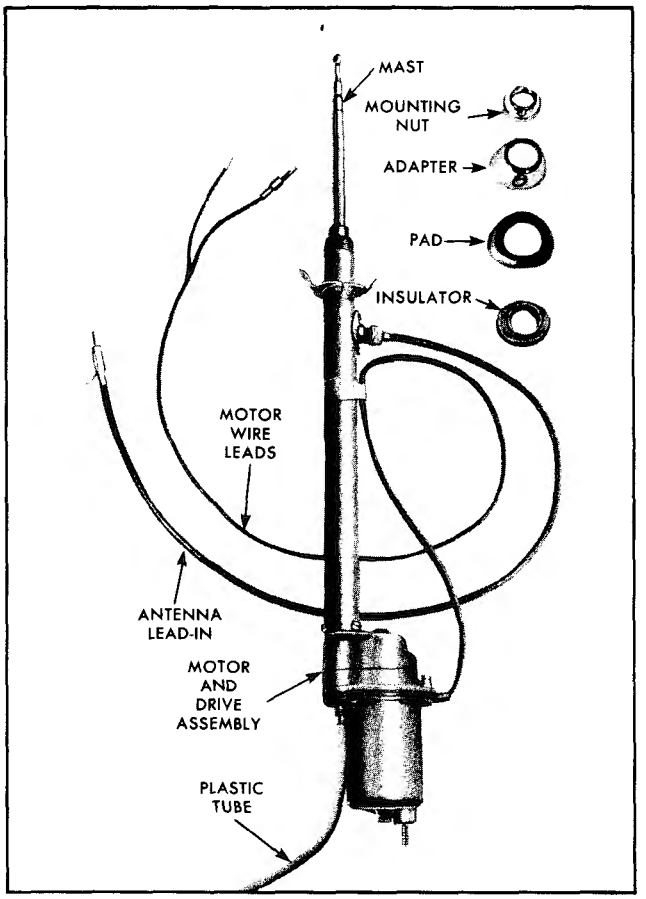

Fig. 14-1 Power Antenna

SEMI-AUTOMATIC POWER ANTENNA—REMOVE, OVERHAUL, AND REPLACE

REMOVE

1. Lower antenna sections and remove upper mounting nut (Fig. 14-1), using Antenna Nut Spanner Wrench J-5185-1; remove adapter and pad.

2. Disconnect wires to antenna motor and disconnect antenna lead-in at point where rear lead-in connects to front lead-in.

3. Remove clips and nylon storage tube from gas tank flange on rear frame cross member.

4. Remove screws which retain fender bracket to fender.

5. Remove antenna assembly and insulator on upper end of tube.

DISASSEMBLE

1. Remove three body tube to motor cover screws and remove body tube.

2. Remove mast sections and nylon strip assembly from motor as follows:

a. If motor is in operating condition connect motor cables to 12 volt current source to operate motor and run nylon strip out of drive pulleys of drive assembly.

b. If motor is inoperative, nylon strip can be pulled out of drive by holding motor firmly and pulling lower or large section of antenna mast until nylon strip is disengaged from drive. NOTE: It may take considerable force to pull nylon strip through motor drive mechanism, but this will not damage unit.

3. If power unit is to be replaced, remove antenna support bracket from power unit, and drive assembly. CAUTION: *Power unit and drive assembly should never be disassembled. This part is serviced only as a unit.*

ASSEMBLE

1. If new power unit is being installed, fasten bracket to stud on lower end of power unit assembly using lockwasher and nut.

2. Insert end of nylon strip of mast sections into opening in motor assembly and connect motor terminals to 12 volt source to operate motor and drive unit. This will draw the nylon strip through motor.

3. Place body tube over mast sections with connector facing motor side, slide body tube down onto motor cover, and install three attaching screws.

4. Inspect plastic tube to make sure it is free of any obstruction due to mutilation or broken nylon strip. Insert nylon strip in tube, position tube on antenna assembly as shown in Fig. 14-1 and fasten plastic tube to motor using two attaching screws.

5. Operate antenna for 10 to 15 complete cycles to make certain it operates properly.

REPLACE

1. Place insulator on flange at upper end of tube; place antenna tube through hole in fender making certain that insulator protrudes through fender.

2. Ensure that fender bracket and flange of fender are clean so as to provide good contact; position bracket on fender and install lock washers and screws.

3. Connect antenna lead-in; connect wires to motor.

4. Replace pad on fender; replace adapter, and upper mounting nut. Tighten nut securely with Antenna Nut Spanner Wrench J-5185-1.

5. Check antenna travel. Time must not exceed 12 seconds for full up or down travel.

6. Replace nylon storage tube.

MOTOR OPERATED ANTENNA — AUTOMATIC

The automatic antenna operates automatically when the radio is turned on or off. When the radio is turned on, the antenna will extend to a height of approximately 30 inches and stop automatically. The antenna can be raised further, if desired, by means of a push button type override switch located under the instrument panel. When the radio is turned off, the antenna automatically lowers completely from any position.

Four electrical switches are used to operate the antenna; the radio on-off switch, a relay located beneath the instrument panel, and two limit switches in the antenna. When the radio is turned on the relay activates the "up" circuit to raise the antenna. When the antenna rises approximately 30 inches the first limit switch in the antenna opens the circuit and the antenna motor stops. When the radio is turned off the relay activates the "down" circuit to lower the antenna. When the antenna is completely lowered, the second limit switch in the antenna opens and the antenna motor stops.

The push button type override switch supplies current directly to the motor "up" circuit by-passing the relay and first limit switch.

PERIODIC SERVICE

The antenna mast sections should be cleaned frequently (at least once a month) with clean water. Cleaning can be done conveniently each time the car is being washed or lubricated. NOTE: When undercoating car, protect drain holes and housing wick so they will not be sealed.

REMOVE AND REPLACE AUTOMATIC ANTENNA

1. Fully lower antenna.

2. Separate lead-in cable at plug-in connector.

3. Disconnect antenna power leads from wiring harness.

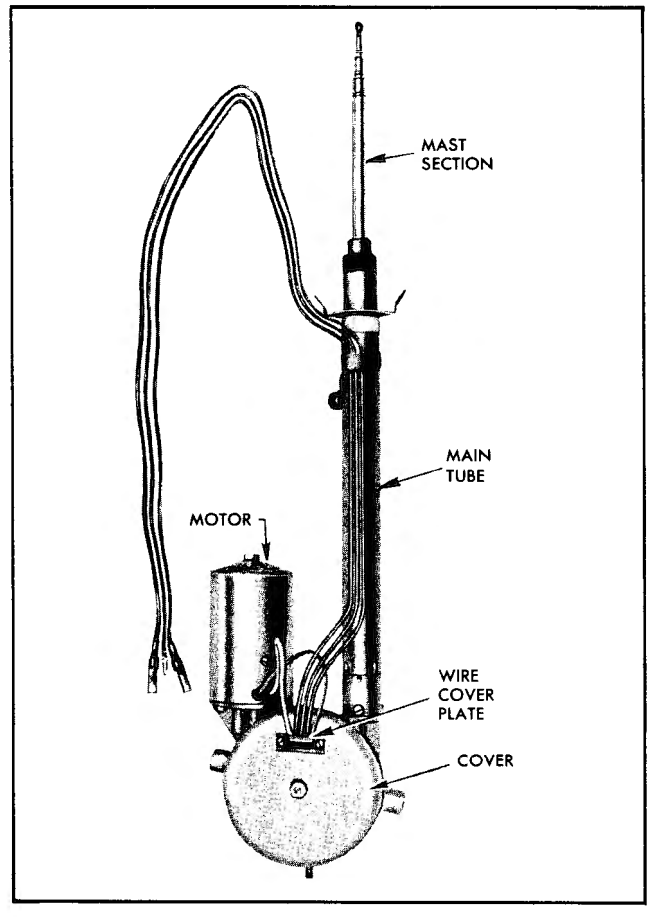

Fig. 14-2 Casco Automatic Antenna

4. Remove dome nut, insulator, and rubber pad from top of antenna.

5. Remove lock nut securing antenna drive unit to mounting bracket.

6. Remove antenna assembly.

7. To install antenna, reverse steps 1 through 6.

DISASSEMBLY OF CASCO AUTOMATIC ANTENNA

1. Remove two screws and wire cover plate (Fig. 14-2).

2. Remove nut and lockwasher from cover and remove cover (Fig. 14-2).

3. To check whether failure is in drive mechanism or switch, secure a 12 volt D. C. power supply and check operation as follows:

a. Ground one lead from power supply to motor case.

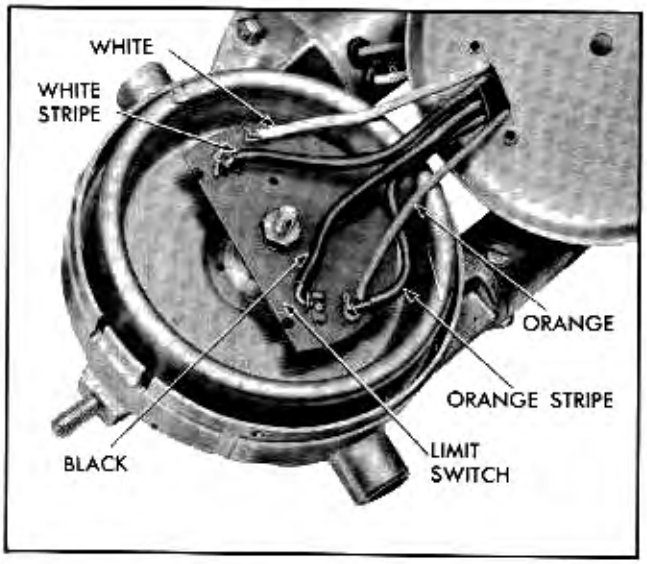

Fig. 14-3 Casco Limit Switch

b. Touch other lead, in turns, to each of the motor leads to operate the antenna up and down.

If antenna operates properly, the trouble is in the limit switch and it should be adjusted, (steps 19-22 under Assembly) or replaced. If antenna does not operate properly, proceed as follows:

4. Remove nut and lockwasher which retain switch and remove switch (Fig. 14-3). **NOTE**: If new switch is installed, solder wires to same terminals as on original switch.

5. Remove washer from center shaft (Fig. 14-4).

6. Remove reel retaining ring and washers from center shaft (Fig. 14-4).

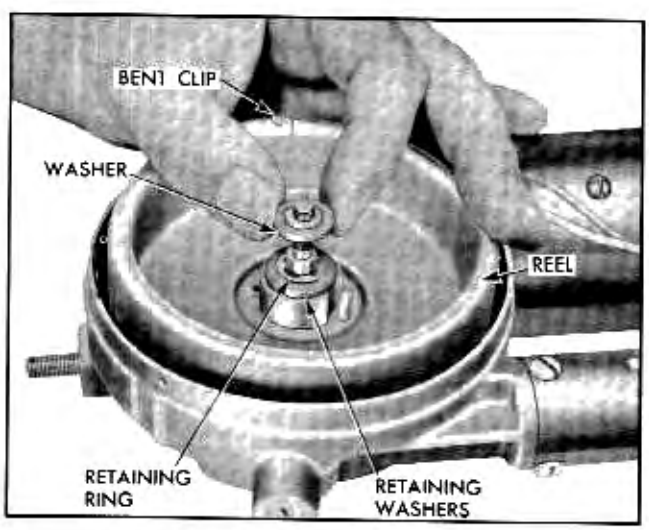

Fig. 14-4 Casco Reel and Retainer

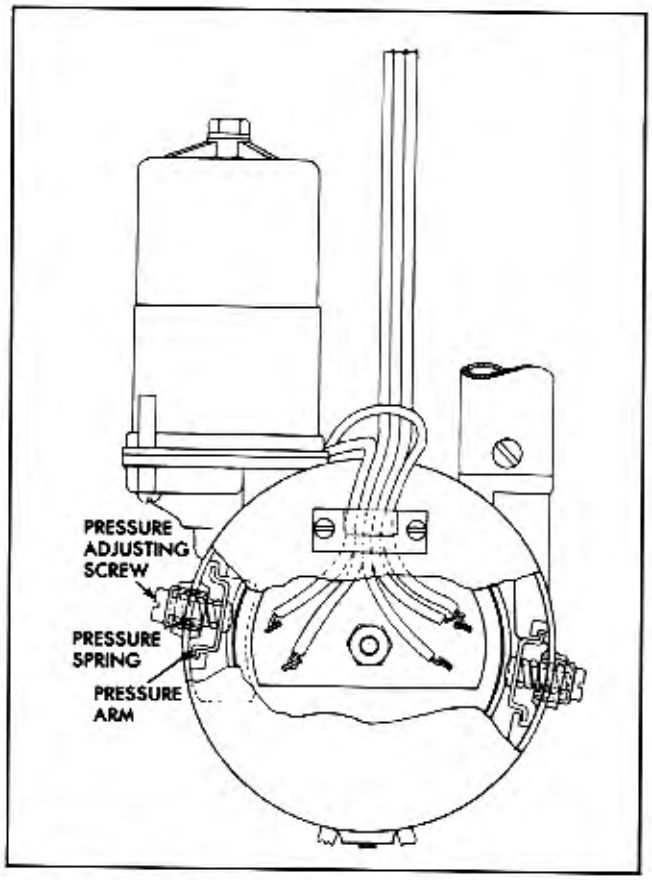

Fig. 14-5 Details of Pressure Arms and Springs

7. Slide reel off center shaft.

8. Remove nylon reed (cord) by straightening the bent clip and disengaging it from slot in reel (Fig. 14-4). Remove clip from reel.

9. Remove two pressure arm adjusting screws from bosses on sides of drive housing and remove pressure springs (Fig. 14-5).

10. Remove screws holding mast section to drive housing.

11. Pull mast section off drive housing. Continue pulling until the nylon reed has been completely disengaged from pulley.

12. Remove antenna mast and nylon reed assembly from main tube by pulling it out through the bottom.

13. Remove two pressure arms from housing (Fig. 14-5).

14. Remove mast section insulating bushing and stop washer from housing.

15. Remove pulley and thrust washer by sliding them off shaft.

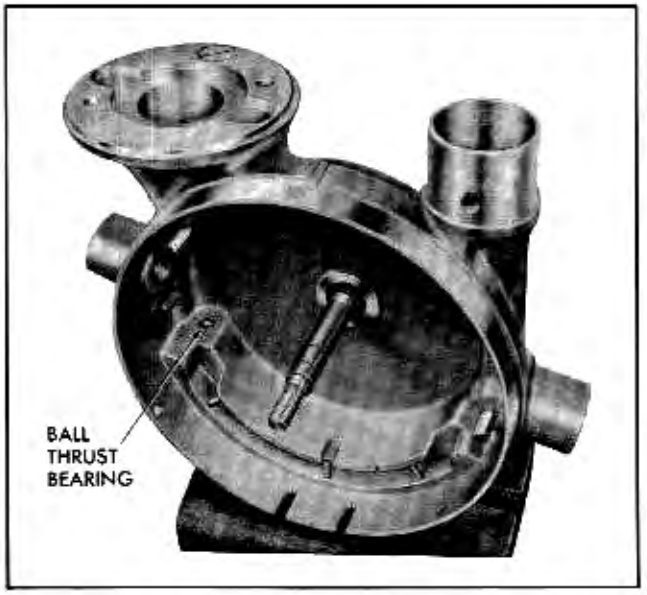

Fig. 14-6 Ball Thrust Bearing In Place

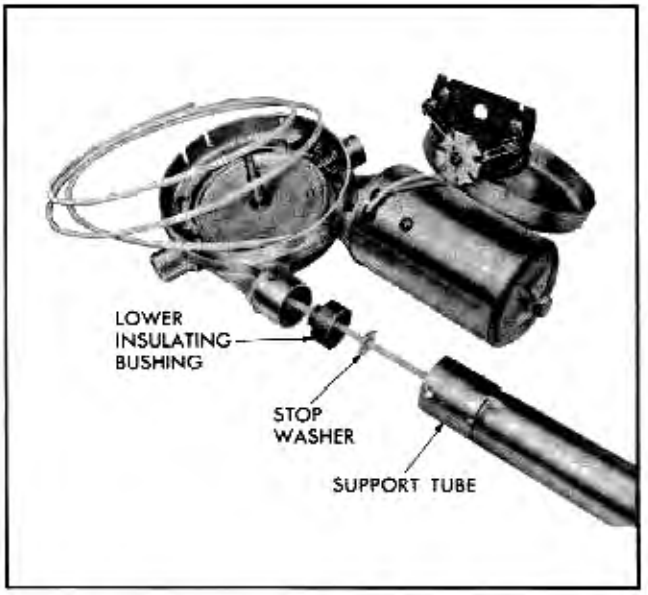

Fig. 14-7 Assembly of Mast Section to Housing

16. Remove two screws which fasten motor to housing.

17. Holding assembly so motor is up, remove motor. Then remove ball thrust bearing and thrust disc from hole in drive housing (Fig. 14-6). NOTE: If new motor is installed, solder leads to terminals of switch to which original motor leads were soldered.

ASSEMBLY OF CASCO AUTOMATIC ANTENNA

1. Holding housing so motor flange is up, place thrust disc in hole in housing and place worm shaft thrust ball on top of disc.

2. Assemble motor to housing with wires toward open side of housing and fasten with two screws. NOTE: Test for proper assembly by making sure there is end play between the end of the worm shaft and the ball thrust bearing. Operation of motor can be tested by connecting it to a 12 volt D.C. power supply.

3. Place steel thrust washer over shaft, then replace pulley on shaft.

4. Place two steel thrust washers over shaft against pulley.

5. Position pressure arms in slots. Pressure arms are not reversible and must be installed so that the button is exactly centered over the spring bore (Fig. 14-5).

6. Install two pressure springs and start the two adjusting screws.

7. Insert mast assembly into main tube from bottom.

8. With mast section assembled slide lower insulator and stop washer over nylon reed.

9. Feed nylon reed through hole in drive housing and into drive pulley. Nylon reed must be installed so painted side is in contact with pressure arms. Continue to feed reed until the mast section is about 2 inches from the housing. NOTE: If desired, the pressure screws can be tightened and the reed can be run in under power.

10. Make sure lower insulating bushing and stop washer are in place and push mast section into place on drive housing (Fig. 14-7).

11. Fasten mast section securely using three attaching screws.

12. Adjust tension of pressure arms by tightening adjusting screws three turns from the point at which they begin to compress tension springs.

13. Attach clip to end on nylon reed so that end of clip will fit into slot in reel when assembled. Crimp clip securely onto reed.

14. Attach clip to reel by inserting tab through the slot and bending it flat against the outside of the reel (Fig. 14-4).

15. Wind slack reed into reel and place reel in position on center shaft. CAUTION: *Make sure nylon is completely inside reel and not caught between reel and drive housing.*

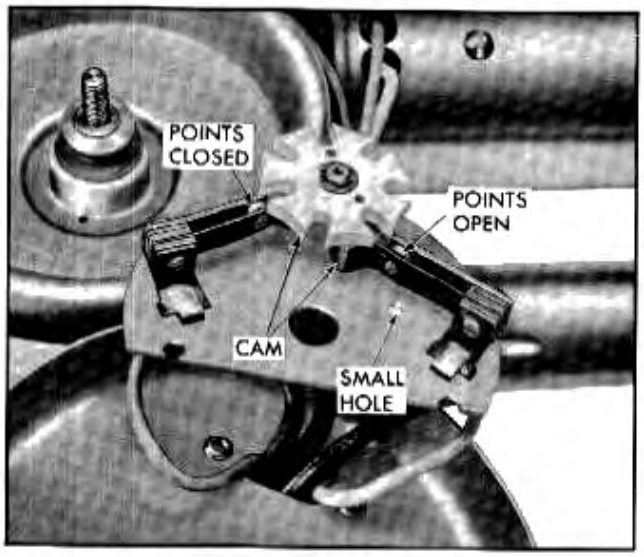

Fig. 14-8 Proper Position of Star Wheel Before Assembly

16. Place retaining washers over shaft against reel and install retaining ring (Fig. 14-4).

17. Check operation of antenna to see that it operates fully up and down, then bring it to the fully down position.

18. Replace the special washer on the shaft with the shoulder up (Fig. 14-4).

19. Check nylon star wheel on switch to see that it is positioned so the cam has opened points nearest small hole in switch base (Fig. 14-8).

20. Place switch assembly on center shaft so nylon star wheel is counterclockwise from the pin in the reel. With switch in this position install lockwasher and nut and tighten finger tight.

21. Rotate switch clockwise until pin in reel trips star wheel causing the points to close. Carefully reverse rotation of switch to re-open points. Rotate counterclockwise to a point 30° to 45° past the point at which the points again opened. Tighten nut securely to hold switch in this position.

22. Test automatic operation of antenna to see that it extends approximately two feet and automatically stops when the black lead of the cable is energized. Energize orange stripe lead to see that antenna extends fully and does not stop automatically. Energize white striped lead to see that antenna comes fully down and then shuts off automatically. When antenna is fully down the top should be 7 to 7½ inches above the top of the main tube. If antenna does not come fully down or if the motor does not stop automatically when the antenna is fully down, the switch has been improperly positioned. Loosen lock nut slightly and rotate switch clockwise to make antenna lower further, or counterclockwise if the motor does not stop automatically.

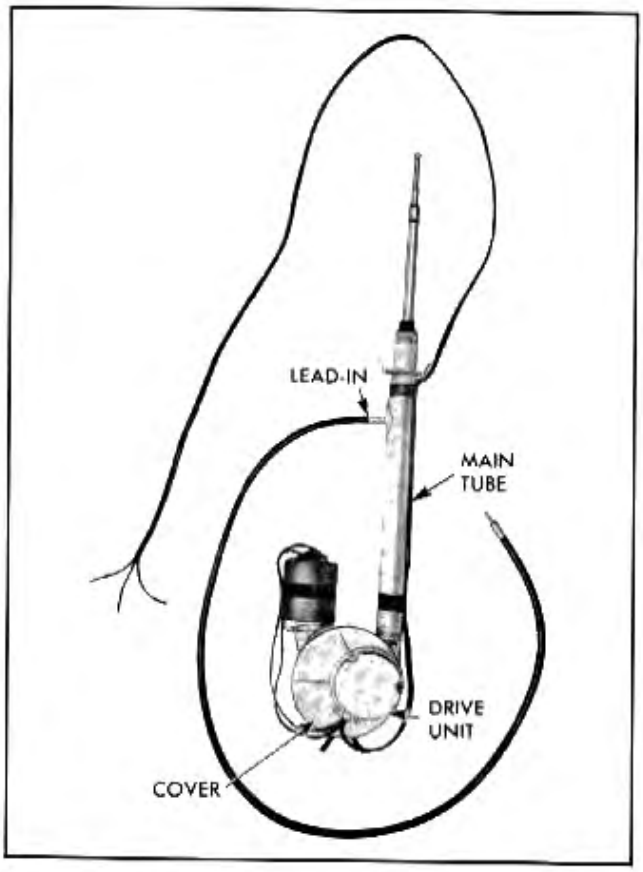

Fig. 14-9 Pioneer Automatic Antenna

REMOVE AND REPLACE MAST ASSEMBLY—CASCO AUTOMATIC ANTENNA

1. Remove antenna from car.

2. Remove mast assembly by following steps 1 through 12 of disassembly procedure.

3. Replace mast assembly by following steps 7 through 22 of assembly procedure.

DISASSEMBLY OF PIONEER AUTOMATIC ANTENNA

1. Remove tape securing lead wires to main tube.

2. Remove main tube assembly by removing two screws holding tube assembly to drive unit (Fig. 14-9). Remove tube by turning and pulling away

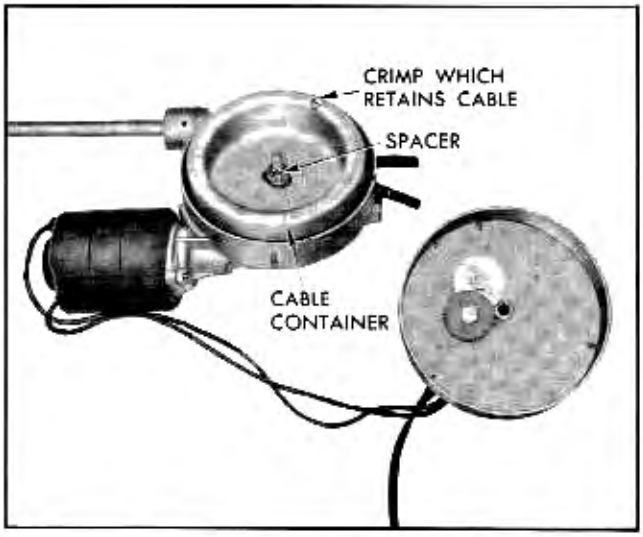

Fig. 14-10 Drive Unit With Cover Removed

from drive unit. Note position of lead-in when removing main tube assembly.

3. Remove three screws holding cover to drive unit and lift cover away from unit. NOTE: If cover and switch assembly is to be replaced, it will be necessary to remove switch cover and unsolder connections, noting location of wires, and solder wires to same terminals of new switch.

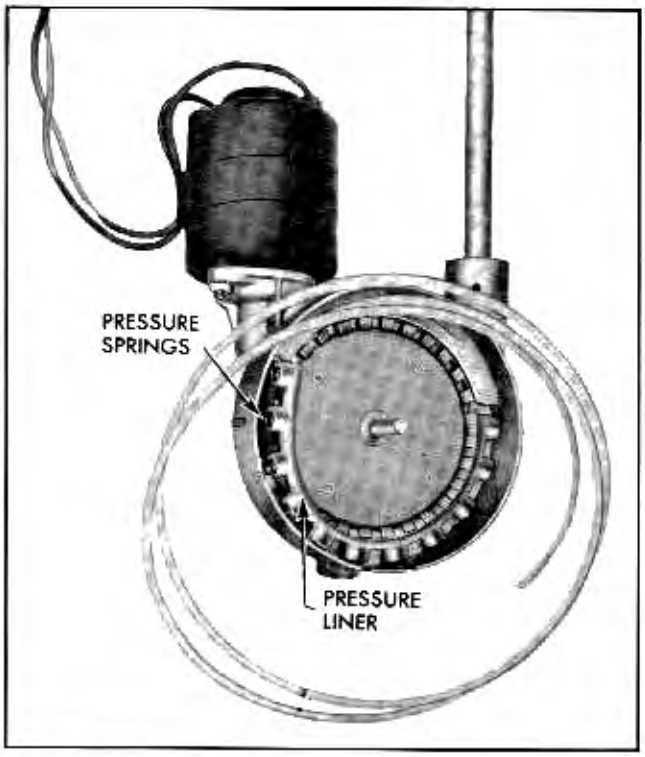

Fig. 14-11 Pressure Liner and Springs

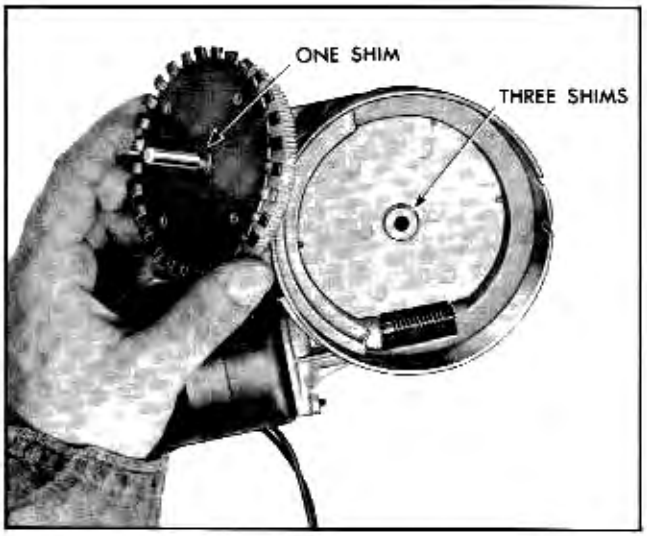

Fig. 14-12 Removing Pressure Liner and Springs

4. Remove pulley shaft spacer and cable container (Fig. 14-10) by lifting both off the driving pulley shaft.

5. Separate cable container from nylon actuating cable by relieving the crimp securing the two parts.

6. Remove felt wick from housing.

7. Remove nylon pressure liner, being careful not to lose springs as it is removed (Fig. 14-11).

8. Remove mast from drive unit, pulling nylon cable out of housing.

9. Remove gear and pulley assembly and shims, noting number and position of shims (Fig. 14-12).

10. If necessary, remove antenna lead-in from upper end of main tube assembly.

11. If necessary, remove upper insulating bushing from main tube assembly.

12. Remove motor assembly with flexible coupling and remove "O" ring and worm shaft, being careful not to lose $\frac{5}{32}$" ball thrust bearing which is at end of shaft (Fig. 14-13). NOTE: If motor is to be replaced it will be necessary to unsolder electrical connections, noting location of wires and solder wires from new motor to same terminals.

ASSEMBLY OF PIONEER AUTOMATIC ANTENNA

1. Install ball thrust bearing, if removed, and install worm shaft to housing.

2. Line up flat side of worm gear shaft with flat side in motor flexible coupling and install motor and "O" ring to housing assembly.

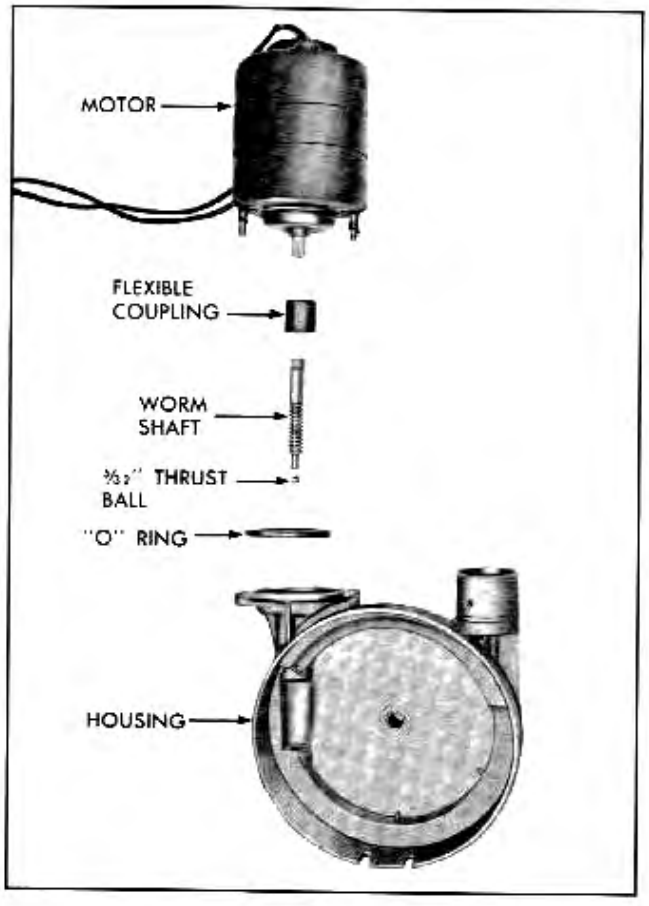

Fig. 14-13 Motor and Shaft—Exploded

3. Install gear and pulley assembly and shims which were originally removed (Fig. 14-12).

4. Install nylon cable and mast assembly into drive unit, lining up holes in lower insulating bushing with holes in drive unit (Fig. 14-14). (Make sure small "O" ring is in place on nylon cord.)

5. While holding nylon cable tightly in pulley groove, install nylon pressure liner with eleven springs.

6. Insert end of nylon cable through metal loop in cable container in proper direction and re-stake end of cable to cable container. NOTE: Insert cable to include all of the undercut portion.

7. Install cable container over the driving pulley shaft.

8. Replace felt wick in slots in bottom of housing.

9. Install pulley shaft spacer and replace cover securing it with three screws.

10. Install upper insulating bushing to upper end of main tube assembly.

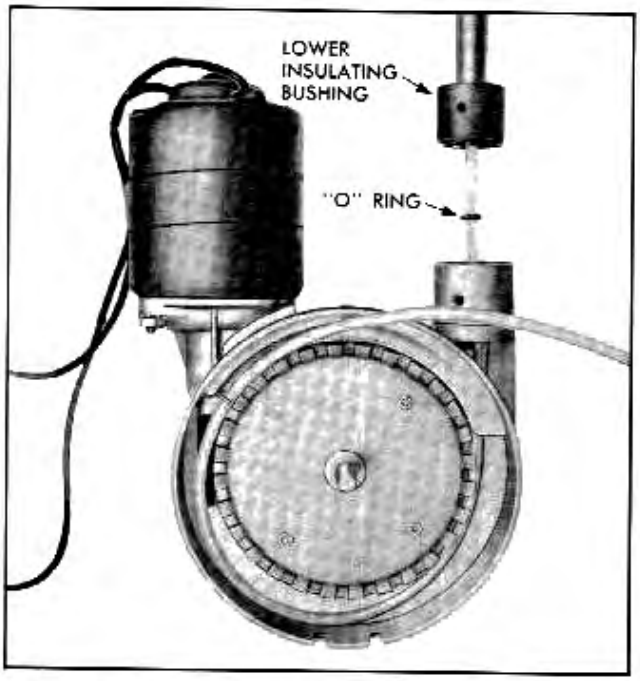

Fig. 14-14 Installing Nylon Cable and Mast Assembly

11. Install lead-in and gasket to upper end of main tube assembly.

12. Install main tube assembly, lining up holes with the holes in the drive unit. Position lead-in as noted on disassembly.

13. Secure lead wires to main tube with tape previously removed.

ADJUST PIONEER CUT-OUT (LIMIT) SWITCH

1. Remove 4 screws securing switch cover to drive unit cover.

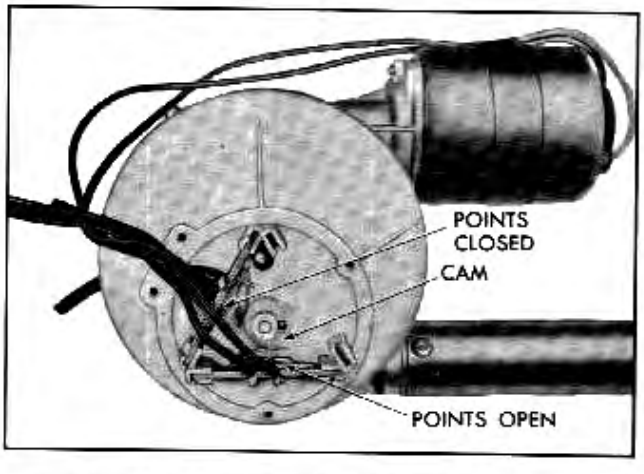

Fig. 14-15 Setting Cam in Proper Position

2. Loosen cam set screw and remove cam assembly.

3. With power applied, lower mast to within ½ inch of its fully collapsed position.

4. Replace cam asembly and rotate until small lobe on lower cam trips switch (Fig. 14-15). Tighten set screw in this position with allen wrench.

5. Check operation of antenna to determine if cut-out occurs at full retraction.

6. Replace switch cover.

REMOVE AND REPLACE MAST ASSEMBLY—PIONEER AUTOMATIC ANTENNA

1. Remove antenna from car.

2. Disassemble antenna by following steps 1 through 5 under "Disassembly of Antenna".

3. Run antenna motor to eject cable from drive unit.

4. With antenna disassembled, insert nylon cable into drive unit and run motor to pull the cable into drive unit.

5. Reassemble antenna, following steps 6, 7, 9, and 12 under "Assembly of Automatic Antenna".

6. Adjust cut-out switch as described above.

REPLACE PIONEER MOTOR ASSEMBLY

1. Remove antenna from car and clamp lightly in vise with motor up.

2. Remove switch cover.

3. Note positions of motor wires and remove from switches.

4. Holding assembly with motor up, remove nuts which retain motor and remove motor. CAUTION: *After motor has been removed, antenna assembly must be kept in an upright position until new motor is installed. If antenna assembly is tipped sideways or laid down, the thrust ball for the motor worm shaft will drop out of place and the drive unit must be completely disassembled to replace it.*

5. With antenna assembly still held upright, install new motor making sure motor shaft indexes properly with the flexible coupling. Tighten motor securely in place.

6. Connect wires temporarily to the proper terminals.

7. Test operation of antenna. If satisfactory, solder wires in place.

8. Replace switch cover.

9. Replace antenna in car.

TROUBLE DIAGNOSIS CASCO AND PIONEER

MOISTURE IN THE MAIN TUBE ASSEMBLY

Weak reception or fading is often caused by moisture in the main tube, due to condensation or leakage through the insulating bushings.

If trouble has been traced to moisture in the main tube, the antenna must be removed, disassembled and thoroughly cleaned. All moisture can be removed by blowing it out with compressed air, then pushing a clean, dry cloth through the main tube, as far as possible. Before assembling the antenna, check the drain holes in the motor housing below the main tube mounting point to be sure they are not obstructed. NOTE: Protect drain holes and housing wick when undercoating car so they will not be sealed.

ANTENNA WILL NOT RAISE OR LOWER

Inability of the antenna rod to raise or lower is usually due to a defective or blown fuse, loose electrical connections at the override switch or antenna relay, or a bent antenna rod. If a check of these causes fails to correct the condition, disassemble the antenna and replace any defective or inoperative parts.

REAR SPEAKERS

Two rear speakers are used. Both speakers have a full range of frequency response to provide an excellent range of tonal characteristics. A four-position speaker switch is used to provide the following combinations:

1. Front speaker only.
2. Both rear speakers with bass notes subdued. This position is especially suited to voice selections or when exceptional clarity is desired.
3. Both rear speakers with full response.
4. All three speakers for maximum fidelity and uniform sound distribution.

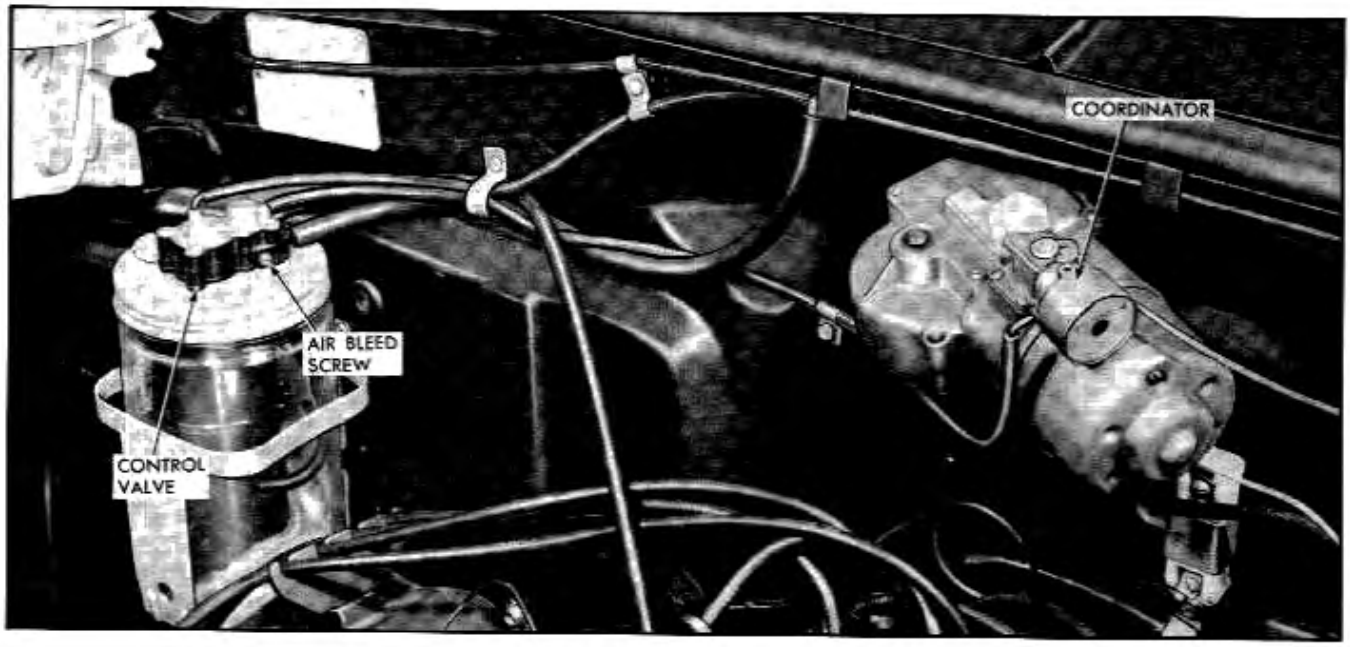

Fig. 14-16 Windshield Washer Control

REAR SPEAKER SWITCH

The rear speaker switch is located below the radio near the left end of the glove compartment door. It is retained to the instrument panel by one screw and can be removed and replaced by reaching over the glove compartment box.

BACK-UP LAMPS

The back-up lamp switch on Hydra-Matic equipped cars is incorporated in the starter neutralizer switch. See the Hydra-Matic Shop Manual for correct adjustment of starter neutralizer and back-up lamp switch.

The back-up lamp switch used with vehicles equipped with Synchro-Mesh transmissions is mounted on the steering column. Moving the shift lever to the reverse position causes the switch actuating pin in the gearshift lower lever to close the switch, completing the electrical circuit anytime the ignition switch is in the "ON" position. The actuating pin should be adjusted to clear the switch by 1/8" when the gearshift lower lever is moved into second gear position.

WINDSHIELD WASHER

A vacuum operated windshield washer squirts water on the windshield via nozzles on the wiper transmission housings. The washer is coordinated with the windshield wipers so that the wipers automatically operate while the washer is working and for 8-12 complete wiper cycles after the water stops.

PRINCIPAL OF OPERATION OF WASHER AND COORDINATOR

The washer control valve is located on top of the pump mechanism (Fig. 14-16). Engine vacuum holds the control valve in the closed position. When the button on the control knob is depressed, it allows atmospheric pressure to enter the control valve. Atmospheric pressure opens the control valve allowing engine vacuum to draw the pump plunger up (water intake stroke). At the same time the vacuum is transmitted to the coordinator piston on the windshield wiper motor where it opens the wiper motor switch and starts the wipers operating. The valves are so arranged that if there is no water in the washer, then the wiper will not operate.

When the vacuum piston in the washer pump reaches the top of its stroke, it closes the vacuum valve by means of a plunger on the upper end of the piston. Atmospheric pressure is then allowed in the area above the vacuum piston and the large piston spring pushes the piston downward. As the piston moves downward the smaller water piston on the lower end pumps water out through the hose to the washer nozzles.

The coordinator is designed to delay the stopping of the wipers until 8-12 complete cycles after the water has stopped. This is accomplished by trapping the vacuum in the coordinator cylinder. An adjustable air bleed determines how long the vacuum is trapped. When sufficient air has bled back into the coordinator cylinder, the piston spring will move the piston back and close the wiper motor control.

The washer and coordinator work exactly the same with vacuum or electric wipers.

ADJUSTMENT OF COORDINATOR

The coordinator should be adjusted to provide 8-12 complete wiper cycles after the water stops flowing. (A wiper cycle is one stroke in each direction). Adjustment is made by turning the air bleed screw (Fig. 14-16) in to increase the number of cycles or out to decrease the number of cycles. NOTE: If the wiper will not turn off at all after the washer is used, the air bleed may be blocked by dirt. To correct, back the screw out until the wiper stops, indicating that the dirt has been dislodged. It will then be necessary to readjust the bleed screw to get the proper delay of 8-12 cycles.

ADJUSTMENT OF NOZZLES

Nozzles should be adjusted, using a small wrench, to direct the stream of water so that it strikes the windshield at a point near the top of the wiper arc, toward the centerline of the car.

CLEANING OF NOZZLES

Remove the small screw from the end of the nozzle, probe the squirt hole with a small wire, flush out the dirt by operating the washer, and replace the nozzle screw.

ELECTRIC WINDSHIELD WIPER GENERAL DESCRIPTION

The electric windshield wiper has a 12 volt D. C. motor with both a series and a shunt field, used to drive a worm shaft which in turn drives an oscillating mechanism through a nylon worm gear. This electrically operated wiper provides approximately a 20% increase in visibility over the vacuum operated wiper. The blade and arm assembly is heavier and utilizes a different blade with increased spring tension to keep the blades on the windshield through a full arc to the end of the wrap-around windshield corner. With this wiper there is no slow down when passing cars, going up hills, or accelerating.

The wiper motor switch is located in the wiper motor housing and is controlled by a cable connected to the switch control knob. The switch control knob which is the same as that used on vacuum wipers is located in the same place on the instrument panel and operated in much the same manner. It is a three position control; off, slow speed and fast speed. There is no detent or feel between the positions, so that when the wiper is turned on, it will usually be turned to the fast speed position. This wiper is also activated when the windshield washer is used the same as with vacuum wiper.

The motor is protected against overheating by a 18 amp. thermal circuit breaker which is built into the case assembly. It is an automatic reset type circuit breaker which, if caused to open through an overload, will automatically reset in a short period of time. For additional protection, a 30 amp. fuse is located in a line holder inside the body above the accessory fuse block. This fuse arrangement is designed primarily to protect the car's wiring harness.

The wiper blades will park in the full down position regardless of their position at the time the switch is turned to "OFF". This is made possible through a cam or eccentric drive mechanism built into the wiper motor assembly. The only differences in the complete wiper assembly between vacuum and electrically operated, are in the wiper motor, wiper arms and wiper blades. The transmissions, cable drives, and cable tension adjustments are exactly the same on either installation.

Do not manually move the blades through any part of the wiper arc at any time. The motor will act as a brake if the wipers are not operating. Forced lateral movement will cause a bent arm and/or a broken wiper transmission. To free blades which have frozen to the windshield move the blades straight away from windshield to remove ice.

Wiper blades should operate through 90-110 wipes per minute on slow speed, 145-170 wipes per minute on fast speed, both with a wet windshield.

VENTILATION AND HEATING AND DEFROSTING SYSTEM

VENTILATION SYSTEM

The air intake for the ventilation system is located at the horizontal portion of the cowl forward of the windshield reveal moulding and flush with the hood.

Outside air enters the louvered intake into an enclosed chamber which extends on each side of the cowl. Air in the chamber travels to inlets in the side cowl trim pads. Control knobs mounted below the instrument panel provide individual control of the air flow through the inlets into the front passenger compartment.

Contour of the air chamber is such that water in the air is deflected away from the inlet ducts, which extend into the chamber and are also flanged to further prevent the entrance of water through the inlets in the cowl trim pads and the heater inlet duct located in the left side of the chamber. A large volume of water, such as would be present when the car is being washed, is prevented from entering the inlet ducts by gutters on the ducts in each side of the chamber.

HEATING AND DEFROSTING SYSTEM

GENERAL DESCRIPTION

The major components of the heating and defrosting system are the underseat heater, defroster, thermostatic control valve, and blower motor.

The heater is located under the front seat and circulates warm air at floor level to both the front and rear compartment by means of a distribution manifold running crosswise of the body under the front seat.

The defroster is located on the left side of the cowl in the engine compartment and discharges cool or warmed air, at the driver's option, across the windshield through slots at the bottom to reduce fogging and icing.

The thermostatic control valve located on the dash insulator behind the instrument panel automatically regulates the flow of hot water to the heater and defroster. In addition to automatic regulation, the valve may be manually opened or closed by the "TEMP" control on the instrument panel.

A blower and motor is located at the end of the heater inlet duct between the tubes leading to the heater and defroster. The blower switch may be set at either of two speeds. The use of the blower for normal driving is at the option of the driver since sufficient air may be forced through the heater and defroster by the forward motion of the car. For low speed driving or under severe conditions, the blower should be used.

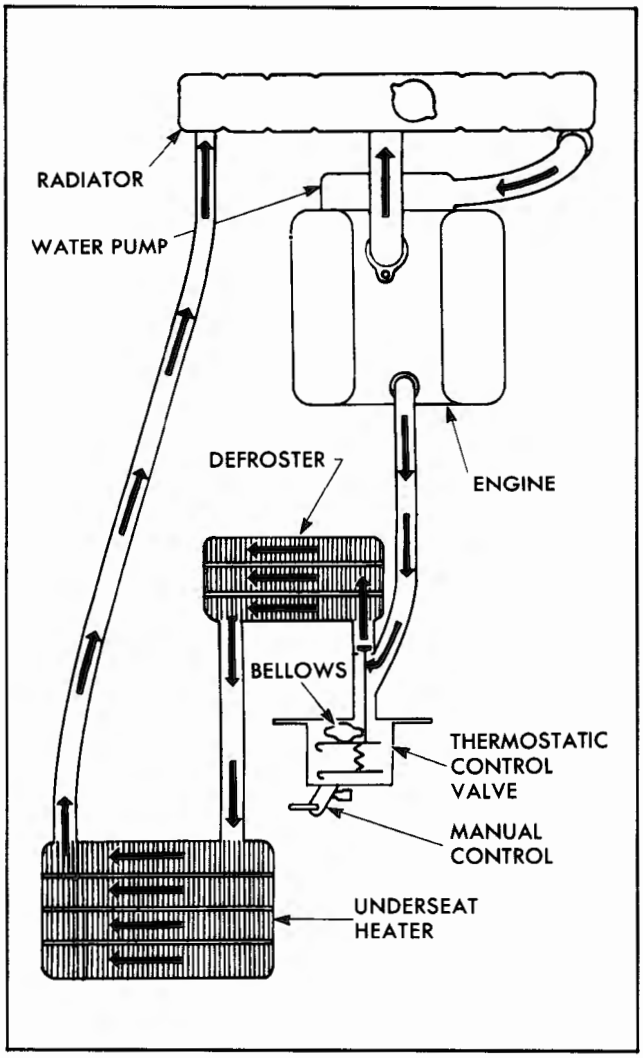

Fig. 14-17 Water Flow Through Heating and Defrosting Systems

WATER FLOW

The water flow in the heater and defroster units is illustrated in Fig. 14-17. Water flows from the water passage in the intake manifold to the thermostatic control valve and then through the defroster core to the underseat heater. From the heater, water flows to the bottom of the radiator from where it is pumped back to the engine.

AIR FLOW

The heater inlet duct is located in the left side of the air chamber. Outside air enters through the air intake and travels downward in the left side of the chamber to the heater and defroster inlet duct. When the air control is in either the "NORMAL" or "DE-ICE" position, the air valve in the heater and defroster inlet duct is open and air is admitted to the

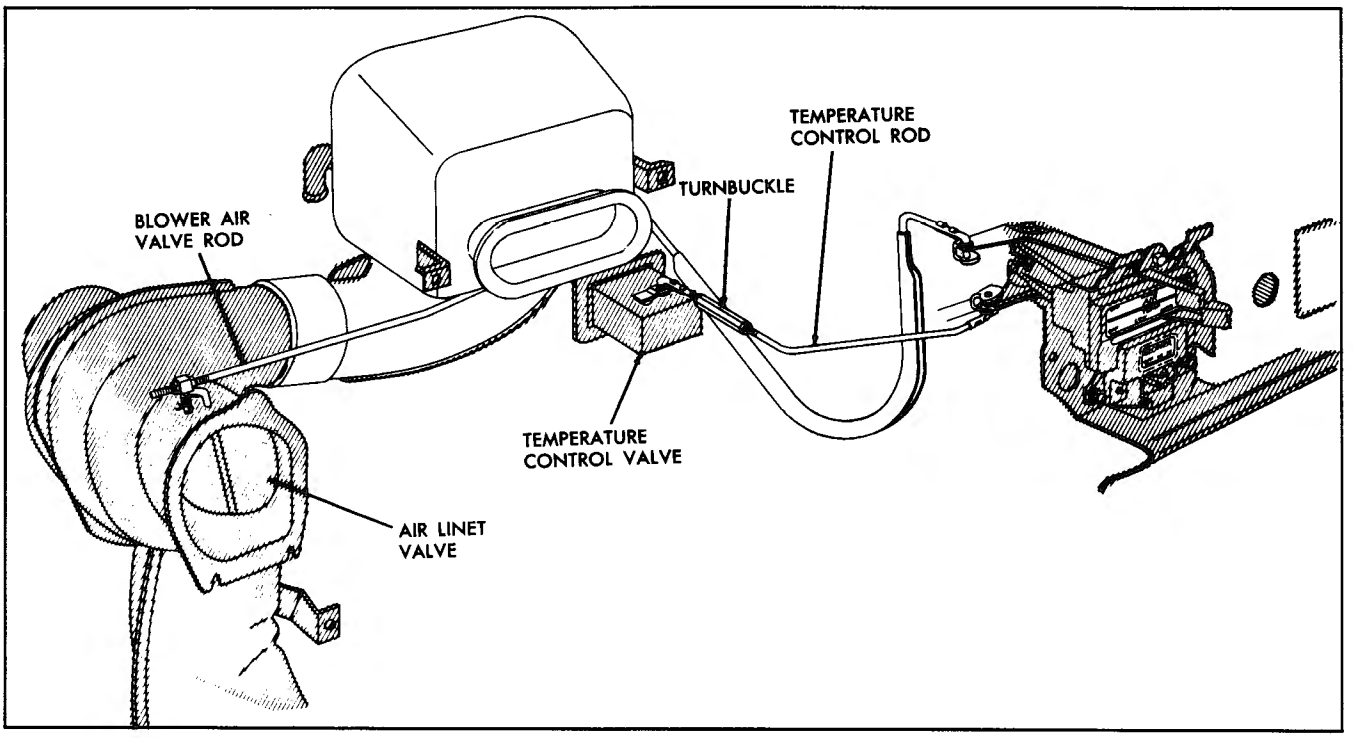

Fig. 14-18 Heater and Defroster Controls

blower motor. From the blower motor air is directed to the defroster unit and underseat heater.

As the air control is moved from "NORMAL" toward "DE-ICE" a valve in the defroster moves to direct air over the defroster core and by-pass less around the core. Thus, at "DE-ICE" position all defroster air passes through the core and reaches the windshield as warm air.

In cool or moderately cold weather the air control can be set at "NORMAL" to provide cool refreshing air at the breathing level. In extremely cold weather, however, the air control should be set at "DE-ICE" so that warm air will be supplied from the defroster nozzles. Otherwise the extremely cold air passing from the defroster nozzles will cool the car, making adequate heating impossible.

ADJUSTMENT OF HEATER AIR CONTROL LINKAGE

1. Loosen trunnion lock nuts at heater air inlet valve under left fender and on defroster valve on right side of defroster (Figs. 14-18 and 14-19).

2. Place air control lever in "DE-ICE" position.

3. Rotate defroster valve lever clockwise (move trunnion to rear) firmly against stop and tighten lock nuts.

4. Place air control lever in the "OFF" position.

5. Rotate heater air inlet valve lever counterclockwise (move trunnion away from center of car) to close air valve tightly. Tighten trunnion lock nuts with lever in this position.

6. Move air control lever through its full range of travel to see that it operates properly.

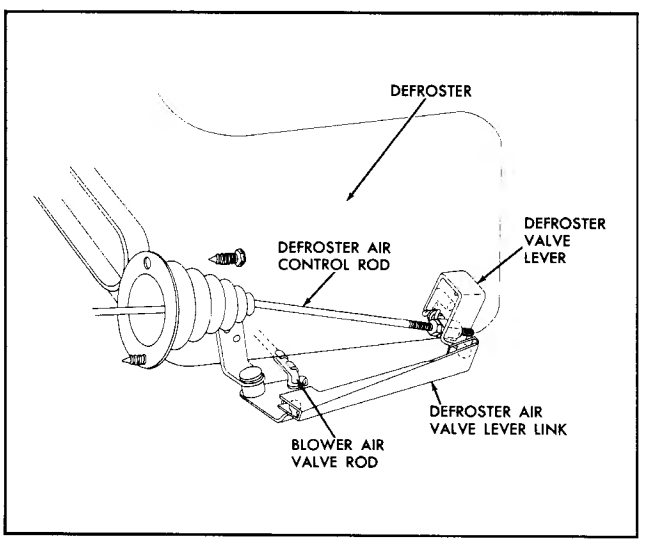

Fig. 14-19 Heater and Defroster Air Control

ADJUSTMENT OF TEMPERATURE CONTROL VALVE LINKAGE

1. Loosen lock nuts at both ends of turnbuckle on temperature control rod (Fig. 14-18). (Short rod to temperature control valve has right hand thread, long rod to control lever has left hand thread.)

2. Disconnect temperature control rod from temperature control valve.

3. Place temperature control lever on control panel in HIGH position and rotate lever on temperature control valve against the stop (away from engine compartment).

4. Rotate turnbuckle to lengthen or shorten the temperature control rod so that it will hold the temperature control valve lever firmly against stop.

5. Tighten turnbuckle lock nuts.

REMOVING AND REPLACING CONTROL PANEL

1. Remove radio control knobs and attaching nuts and remove instrument panel finish plate.

2. Disconnect control panel lights and blower switch wires from control panel.

3. Disconnect control rods from levers.

4. Remove three control panel retaining screws and remove control panel.

5. Replace control panel by reversing the above steps.

HEATER AND DEFROSTER TROUBLE DIAGNOSIS

1. Kinked Hoses

Observe all heater hoses for presence of kinks which would restrict the flow of water. Check especialy the intake manifold to temperature control valve hose.

This hose makes a sharp bend at the vertical pipe threaded into the front of the intake manifold. When a kink is observed at this point, a new hose should be installed.

2. Floor Mats

Check front floor mat to see that it is under the floor mat hold down clip and is flat and not cutting off part of air flow. Rear floor mat should be retained by the heater air distributor duct.

3. Engine Thermostat

The thermostat can be checked for proper operation using hot water and a thermometer.

4. Defroster Nozzles

Check defroster nozzles to be sure that they are not pinched together, blocked by windshield rubber or installed partially under the garnish molding.

ELECTRIC CLOCK

GENERAL DESCRIPTION

The electric clock is operated by current from the car battery so that hand winding is eliminated. Automobile clocks operating on direct current from the car battery must not be compared too closely for accuracy to the home electric clock operating on alternating current. The cycles per second of alternating current used in the home are controlled and periodically corrected at the power house, thereby eliminating accumulation of errors.

With the direct current system such as used in a car, no such control is possible; therefore, automobile electric clocks will accumulate errors day by day the same as hand wound, spring operated clocks.

The Pontiac electric clock provides automatic regulation of the rate when the position of the hands is changed. Movement of the hands forward or backward automatically adjusts the length of the hair spring to make the clock run slower or faster. The amount of change in rate depends upon the amount the hands are changed. Maximum rate change is approximately 20 seconds per day and is obtained when the hands are moved five minutes. If the clock is reset less than five minutes the change in rate is proportionally less than 20 seconds.

SETTING CLOCK

When setting clock to correct for errors in time, pull reset stem out, move hands counterclockwise to correct time if clock is running fast, or move hands clockwise to correct time if clock is running slow, then allow reset stem to return to its normal position. This will automatically adjust the rate of the clock to run slower if it is running fast, or faster if it is running slow.

Owners should be advised to set the clock to the correct time once a week at regular intervals to ensure maximum accuracy.

REMOVING AND REPLACING CLOCK

To remove clock, disconnect clock power cable to prevent short circuits, then remove wing nut and "U" shaped clamp from back of clock. The clock can

then be removed from the instrument panel and the wires disconnected. Replace clock by reversing this procedure. NOTE: In cars with air conditioning it is necessary to lower the glove box to gain access to the back of the clock.

DUAL EXHAUST

The dual exhaust system provides direct exhaust from the left and right bank exhaust manifolds, thereby eliminating the crossover pipe. The dual exhaust system also improves engine performance because of back pressure reduction. The dual mufflers are basically the same construction as the single muffler type; therefore, the capacity to pass exhaust gases with the heat control valve open has doubled. The mufflers and pipes are not interchangeable with each other or interchangeable with the standard single muffler type that is used on all models.

Dual exhaust mufflers have zinc coated internal parts to resist corrosion which is more severe with dual mufflers.

KLAXON "K-3" HORN

The Klaxon "K-3" horn is an accessory high note horn which, combined with the two standard equipment horns, gives a more pleasant and powerful signal. It has a frequency higher than that of either of the standard horns.

Service information and current adjustment are the same as for the standard horns except that the current should be set to 7.5-11.0 amps. at 12.5 volts.

INSIDE NON-GLARE (TILTING) MIRROR

The new mirror is 2" longer to provide increased viewing area. Also important, a new tongue and groove type joint enables much greater range of vertical positioning of the mirror. By means of the greater range of travel of this joint and an added zone of travel available by turning the curved ball stud over in the joint, the needs of every driver should be satisfied. Maximum upward position can be obtained by rotating mirror so that the "Day-Night" tab is at the top (Fig. 14-20). NOTE: If objectionable reflections are noted with the mirror in this position at night, turn the mirror to the normal position (tabs at bottom) for night use. Variations in mirror position can be made as shown in Fig. 14-20.

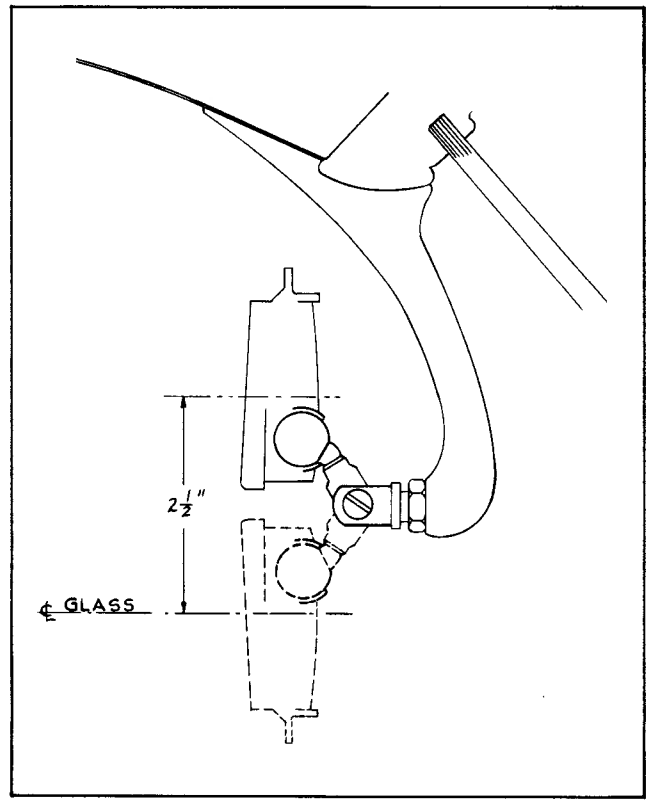

Fig. 14-20 Maximum Upward and Downward Positions of Non-Glare Rear View Mirror

HANDICAP CONTROLS

ACCELERATOR AND BRAKE HAND CONTROL ADJUSTMENT

1. Adjust accelerator rod to provide a positive closed throttle condition when accelerator return spring brings cross shaft lever against its stop.

2. Adjust brake tube assembly to bring hand lever against its stop on the accelerator shaft without depressing brake pedal.

HAND OPERATED PARKING BRAKE

The hand operated parking brake employs a pull type cane handle to operate the parking brake. The handle is connected to the parking brake foot lever by means of a cable which runs through a pulley, and a bracket attached to the foot lever. When the handle is pulled back, the cable pulls the foot lever down, applying the parking brake.

A retainer bolted to the underside of the instrument panel holds the brake release lever in the released position so that it will not interfere with the use of the cane handle.

ADJUSTMENT OF CABLE

The cable trunnion in the foot lever bracket should be adjusted so the cable is just snug when the hand brake is released.

AUTOMATIC HEADLAMP CONTROL "AUTRONIC-EYE"

GENERAL DESCRIPTION

The automatic headlamp control, "Autronic-Eye", is an electronic device that automatically switches the headlamps between the upper and lower beams in response to light from an approaching car. This device consists of four separate units; the function and operation of each is described briefly in the following paragraphs.

The phototube unit (Fig. 14-21), mounted on the top left side of the instrument panel, is an optical device equipped with a lens which picks up light from an approaching car and focuses it through a filter and mask to a phototube. This phototube converts the light into an electrical signal which is conducted, by a cable, to the amplifier unit.

The amplifier unit is mounted under the hood on the right fender skirt and supplies voltage to both the phototube and the power relay.

In response to a signal from the phototube unit, the amplifier unit operates the power relay to lower or raise the headlamp beams.

The power relay is mounted under the hood on the dash near the defroster and switches the headlamps between the upper and lower beams. It is a heavy duty relay with special alloy contacts and is operated by the amplifier unit.

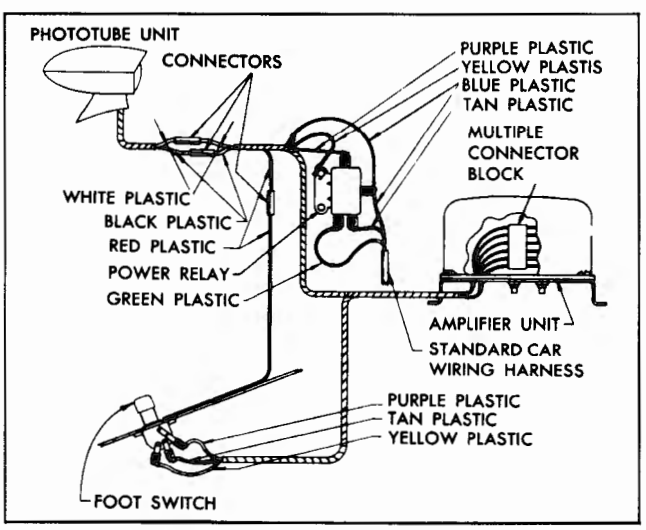

Fig. 14-21 Wiring Diagram for Automatic Headlamp Control "Autronic Eye"

The foot switch is a combination headlamp dimmer switch and "Autronic-Eye" over-control switch. Headlamps are controlled automatically in only one position of the foot switch. The other position of the switch provides constant low beam operation. Positions are selected by pushing down on the switch with the foot.

When the foot switch is in the automatic position, it can be used as an override switch to manually turn on the high beams by applying a slight downward pressure on top of the switch. This arrangement permits signalling if desired and provides a simple test for the automatic position of the foot switch.

In the "automatic" position of the standard foot dimmer switch, the "Autronic-Eye" provides complete automatic switching of the headlamp beams on the car to which it is installed. When a car approaches, the light from its headlamps strikes the phototube unit which causes the automatic headlamp control to switch the headlamps to the lower beam. At this time, if the driver of the approaching car had on the upper beams, he would normally switch to the lower beam; thus, greatly reducing the amount of light falling on the phototube unit. The unit is designed to maintain its vehicle headlamps on a lower beam even with this reduction in light. When light is removed from the phototube unit, the automatic headlamp control returns its vehicle headlamps to the upper beam.

If the approaching vehicle fails to switch to its lower beam, the over-control section of the foot switch may be operated to provide an upper beam for signalling purposes. Street lights and extraneous lights encountered in the city are sufficient to cause the automatic headlamp control to maintain the vehicle headlamps on the lower beam.

At times, it may be desired to operate the standard foot dimmer switch to the "lower beam" position, when following a vehicle to avoid glaring its driver through the rear window.

The "Autronic-Eye" is disconnected from its vehicle headlamps in the "lower beam" position of the foot dimmer switch; however, it is not turned off. It continues to function as long as the headlamps are turned on, and is ready at all times to provide automatic control whenever the standard foot dimmer switch is returned to the "automatic" position.

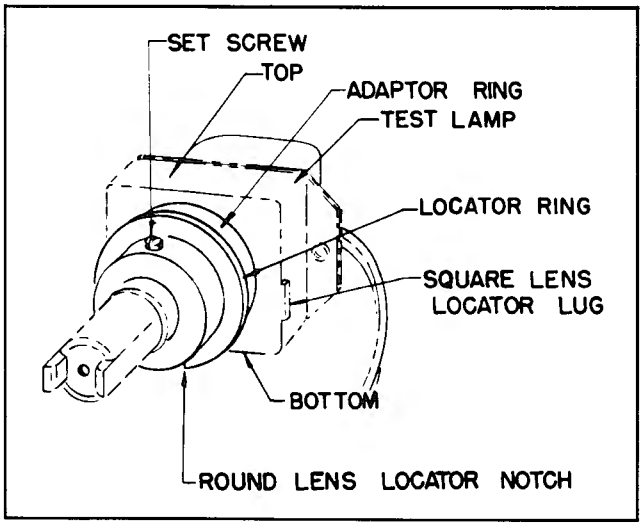

Fig. 14-22 Test Lamp and Adapter Ring

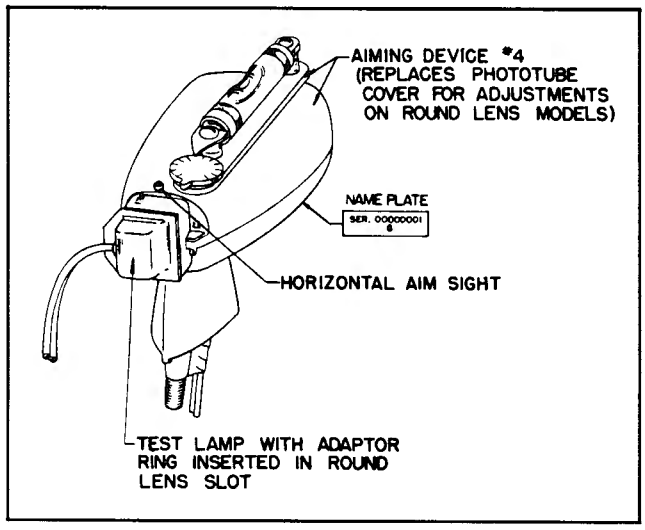

Fig. 14-23 Test Lamp and Aiming Device Mounted on Phototube

ADJUSTMENTS

The "Autronic-Eye" is adjusted at the factory and should hold its adjustment over a long period of time. However, there may be occasions when the aiming or the sensitivity controls may require adjustment. These adjustments are made by using a special tester designed for the "Autronic-Eye". Use the following instructions for aiming and adjustment.

ADAPTOR RING AND AIMING DEVICE No. 4

In order that the above testers may be used in the round lens models, an adaptor ring and aiming device No. 4 has been made available through the manufacturers of the testers. The correct aim and sensitivity adjustments cannot be obtained on the round lens models without the use of this adaptor ring and aiming device.

As shown in Fig. 14-22, place the widest side of the adaptor ring over the barrel of the test lamp and slide as far back as it will go against the square block of the test lamp. Rotate the ring until the center of the notch in the locating ring is in line with the center of the bottom of the test lamp. Tighten the set screw securely so the ring cannot slip. There is no need to remove the ring once it is installed. When adjusting the square lens models, use the same locating lugs on the square block as before and the adaptor ring will be inside the phototube unit and out of the way.

The Aiming Device No. 4 (Fig. 14-23) consists of a special phototube unit cover with the leveling device mounted on it. Two horizontal aiming sights, located on the center line of the special phototube unit cover, are explained under Horizontal Aiming, page 14-20. NOTE: Do not use the square lens aiming device on the round lens models.

To adjust the aim and sensitivity on the round lens models, remove the regular cover and lens from the phototube unit. Install the test lamp in the base by inserting the locator ring in the lens slot. The lens locator in the phototube unit base must fit in the locator ring notch. Replace the regular cover with the new aiming device (Fig. 14-23). Be sure the cover retaining screws are tightened securely. Follow the instructions for aiming and sensitivity adjustments on car.

CAUTION: *The aiming device No. 4 contains a special filter to permit use of the same meter settings on the tester for round lens models as for square lens models. This filter should be kept free of dust and foreign particles. If filter is damaged the aiming device must be returned to tester manufacturer for repair. This filter does not replace the amber filter in the phototube unit which must be left in place as before.*

VERTICAL AIM OF PHOTOTUBE UNIT

Proper performance of the automatic headlamp control requires that the phototube unit be accurately adjusted for both horizontal and vertical aiming. (Horizontal aiming procedure is explained on page 14-20.) Aimed too low, back reflections from headlamps of car on which the "Autronic-Eye" is installed will hold its own headlamps on low beam. However, unit must be aimed as low as possible to provide maxi-

mum tolerance for car loading. IMPORTANT: Vertical aiming should be done with car unloaded, trunk empty except for spare tire, correct tire pressure and preferably with gas tank at least half full.

1. Locate car on level floor. Floor must be level within ¼" fore and aft of car.

2. Rock car sideways to equalize springs.

3. Install aiming device No. 4 according to instructions under Adaptor Ring and Aiming Device No. 4.

4. Observe number stamped on name plate on bottom side of phototube unit (Fig. 14-23) and adjust dial of Aiming Device No. 4 to this number.

5. Adjust phototube aiming screw until bubble is centered in level using Allen wrench located inside tester cover.

SENSITIVITY TESTS AND ADJUSTMENTS ON CAR

HOLD SENSITIVITY TEST

CAUTION: The "Autronic-Eye" develops 800 volts. Turn headlamps OFF before removing cover from the phototube unit.

1. Install Aiming Device No. 4 according to instructions under Adaptor Ring and Aiming Device No. 4.

2. Turn headlamps ON and wait at least four minutes for amplifier to stabilize. Set standard foot dimmer switch to "Automatic" position.

3. Turn zero corrector on face of meter until meter pointer is on zero set line.

4. Turn intensity rheostat of tester counter-clockwise.

5. Operate engine at fast idle when making sensitivity tests and adjustments.

6. Turn selector or Dim-Hold switch to "Dim" position. NOTE: Some testers provide a selector switch for setting meter to proper Dim-Hold position for clear or tinted windshield. Other testers provide a Dim-Hold switch and separate meter scales for clear or tinted windshield.

7. Turn intensity rheostat all the way clockwise to end of adjustment to obtain a lower beam.

8. Turn tester selector or Dim-Hold switch to HOLD position.

9. Slowly turn intensity rheostat counter-clockwise just to point where headlamps switch to upper beam.

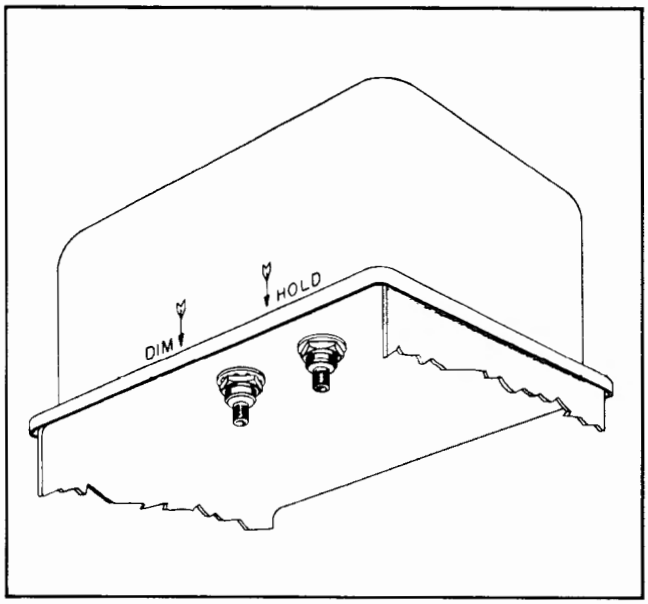

Fig. 14-24 Adjustment Controls on Amplifier

The meter pointer should now read in hold sensitivity adjustment bar on the meter scale.

If HOLD sensitivity is not properly adjusted, proceed with HOLD sensitivity adjustment.

HOLD SENSITIVITY ADJUSTMENT

The hold and dim adjustments are knurled fingertip controls located on the bottom (outside) of the amplifier unit. The location of each is indicated by a stamp on the amplifier cover (Fig. 14-24). NOTE: The dim sensitivity adjustment must not be made until after the hold sensitivity is correctly adjusted.

1. Turn hold adjustment clockwise to end of adjustment.

2. Rotate intensity rheostat all the way clockwise.

3. Turn selector or Dim-Hold switch momentarily to DIM position to switch lights to lower beam, then switch back to HOLD position.

NOTE: If lights do not switch to lower beam, the DIM control must be turned clockwise to end of adjustment and then readjusted after HOLD adjustment is correct.

4. Adjust tester intensity rheostat until meter pointer is in right hand side of hold sensitivity bar.

5. Turn the hold control counter-clockwise slowly just to the point where headlamps switch to upper beam.

6. Rotate tester intensity rheostat clockwise to end

of travel, then turn selector or dim-hold switch momentarily to DIM position and back to HOLD.

7. Recheck Hold adjustment by turning intensity rheostat slowly counter-clockwise just to point where headlamps switch to upper beam. Meter pointer should now read in hold sensitivity adjustment bar if adjustment is correct. If not repeat procedure starting with Step 1.

DIM SENSITIVITY TEST

1. Rotate tester intensity rheostat completely counter-clockwise.

2. Turn selector or Dim-Hold switch to DIM position. Headlamps should be on upper beam.

3. Turn intensity rheostat slowly clockwise stopping at the exact point where the headlamps switch to lower beam. Meter pointer should read within the dim sensitivity adjustment line.

If dim sensitivity is not properly adjusted proceed with dim sensitivity adjustment.

DIM SENSITIVITY ADJUSTMENT

1. Rotate dim control completely counter-clockwise (Fig. 14-24).

2. Momentarily turn tester off then back to dim position. Headlamps should now be on upper beam.

3. Adjust intensity rheostat until meter pointer reads in the right hand edge of the dim sensitivity adjustment line.

4. Slowly rotate dim control clockwise just to point where headlamps switch to lower beam. Do not go beyond this setting.

5. Turn tester intensity rheostat completely counter-clockwise, then momentarily turn tester to OFF and back to DIM.

6. Rotate tester intensity rheostat slowly clockwise just to point where headlamps switch to lower beam. Meter will read within dim sensitivity line if adjustment is correct. If not, repeat step 1 thru 5.

7. Turn off headlights and disconnect tester from cigar lighter receptacle.

8. Remove tester and aiming device No. 4 from phototube unit. Replace lens cover and screws.

INSTALLATION WIRING

If trouble is in the phototube unit or the amplifier unit, both should be removed from the car and serviced. If trouble is located in the power relay or the foot switch, the defective unit should be replaced. A disconnect block has been provided in the amplifier unit to allow the "Autronic-Eye" to be removed without removing the interconnecting harness from the car. NOTE: In an emergency where service is not available, the Autronic-Eye should be disconnected by removing the short blue and tan wires leading to the amplifier tube socket from the disconnect block. The car headlamps will then be manual controlled by the standard foot dimmer switch.

The following procedure should be followed in removing the Autronic-Eye from the car:

1. Remove amplifier cover.

2. Disconnect harness wires from disconnect block.

3. Remove amplifier unit mounting bolts.

4. Remove grommet and wiring harness from amplifier base.

5. Remove amplifier unit from car.

6. Tape terminals on blue wire and tan wire.

NOTE: Must be insulated from the car.

7. Disconnect the black and white wires under the dash.

8. Remove phototube unit from dash.

When the harness is removed from the amplifier unit, the car headlamps will revert to manual operation and will switch between upper and lower beam by operation of the foot dimmer switch. NOTE: When amplifier unit is removed from the car, be sure the terminals on blue wire and tan wire in harness are insulated from the car.

The interconnecting harness should be in accordance with wiring diagram (Fig. 14-21).

When reinstalling the amplifier unit, replace the harness and grommet in amplifier base. (Be sure the grommet is properly seated in base.) Connect harness wires to disconnect block—matching wire colors with wires in amplifier unit.

HORIZONTAL AIM

When reinstalling the phototube unit, the locating pin on the rear of the mounting bracket must be properly mounted in the locating hole in car dash

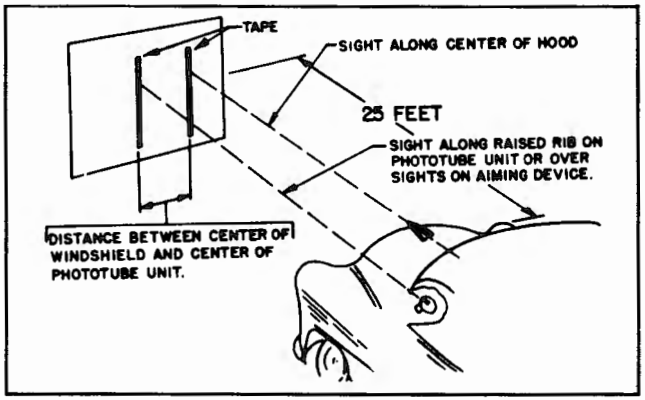

Fig. 14-25 Checking Horizontal Aim

to provide the correct horizontal alignment. The centerline of the phototube unit must be aimed parallel to the horizontal centerline of the car. Unsatisfactory operation on curved highways will result if horizontal aim is incorrect. The horizontal aim should be checked as follows:

1. Locate the car approximately 25 feet from a vertical wall or screen (Fig. 14-25).

2. Sight through the back window and windshield, past the car hood and place a piece of tape on the wall at hood height to represent car centerline.

3. Measure distance between centerline of phototube and center of car windshield. Place a second piece of tape on the wall this distance to the left of the car centerline.

4. One of the following two procedures may now be used.

(a) Sight along raised rib on phototube unit—should point at line established on wall to left of the car centerline.

(b) Replace cover of phototube unit with aiming device No. 4. Sight over top of two sights on the aiming device—should point at line established on wall to left of the car centerline.

If horizontal aim is not correct, remove the phototube unit from car dash and elongate one side of the mounting stud hole in the instrument panel sufficiently to rotate the unit for correct aim. Vertical aim must be checked after relocating phototube unit.