SECTION 10-G
LIGHTING SYSTEM

CONTENTS OF SECTION 10-G

SERVICE BULLETIN REFERENCE

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10-53 LIGHTING SWITCH AND CIRCUIT BREAKER

a. Description of Lighting Switch

The lighting switches used in 1948 models and 1949 series 50-70 are similar in design, except that the 1949 Series 50-70 switch incorporates a rheostat for controlling the brilliance of the instrument panel lights, thus eliminating the separate instrument panel light switch used in 1948 models. Both switches have a thermo circuit breaker for protecting the lighting circuits.

Both lighting switches are "push-pull" types operated by a knob marked "LIGHTS". Three positions of the switch knob provide control of the lights as follows:

(1) *"Off" position* (knob all the way in) cuts off all lights controlled by the switch.

(2) *"Parking" position* (knob pulled out to first notch) turns on the parking lights, tail lights, and license light. The instrument lights will also be turned on if the controlling light switch (1948) or rheostat (1949) is turned "on".

(3) *"Driving" position* (knob pulled out to last notch) turns parking lights off and turns headlights on, while the other lights remain as in the "Parking" position. The headlights will be on the "upper" or "lower" beams depending on the position of the separate dimmer switch.

On 1949 Series 50-70, the lighting switch knob may be rotated to operate the rheostat which controls the brilliance of the instrument panel lights. Turning knob counterclockwise increases brilliance of lights; turning knob clockwise decreases brilliance and at limit of clockwise travel the lights are turned off. Instrument panel lights burn only when switch knob is in "Parking" or "Driving" position.

b. Description of Thermo Circuit Breaker

A thermo circuit breaker is incorporated in the lighting switch assembly, to protect wiring from damage due to short circuits in any lighting circuit controlled by the switch, as well as the stop lamps, map lamp and glove box lamp circuits.

The thermo circuit breaker consists of a bi-metal blade and set of contact points connected in series with the lighting circuits. An abnormal flow of current through the circuit breaker, such as would be caused by a short circuit in a lighting circuit, heats the bi-metal blade sufficiently to separate the points and cause them to vibrate. The vibrating blade alternately opens and closes the circuit, thus reducing the flow of current and protecting the wiring against overheating and burning. The flickering light produced by the vibrating circuit breaker serves as a warning to the operator of vehicle that a short circuit exists.

c. Test of Lighting Switch

If the lighting switch is suspected of being faulty, the contacts can be tested by connecting a short jumper wire between No. 1 terminal and

the other terminals while observing any change in the brilliance of lights affected.

With switch in "Parking" position (first notch out) connect jumper wire between No. 1 and No. 2 terminals and note change in parking lights. Bridge between No. 1 and No. 3 terminals and note change in tail lights. With switch in "Driving" position (last notch out) bridge between No. 1 and No. 4 terminals and note change in headlights.

If no change in brilliance of lights is noted the switch contacts are satisfactory and the cause is in the wiring circuit connections or lamp bulb. If switch is faulty it must be replaced since internal repairs cannot be made.

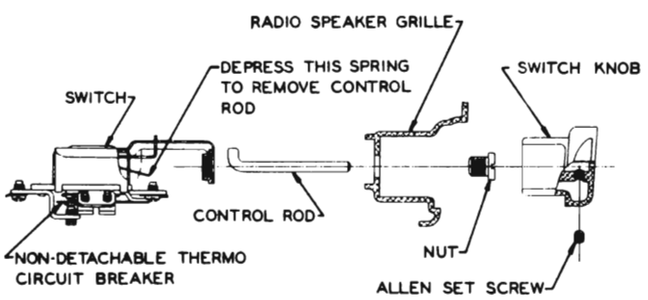

Figure 10-92—1948 Model Lighting Switch Removal

d. Replacement of Lighting Switch

1. Disconnect ground cable from battery and disconnect wires from lighting switch.

2. *On 1948 model switch,* remove switch knob by loosening set screw on underneath side of knob, using $^{3}/_{32}$" Allen wrench. See figure 10-92.

2a. *On 1949 Series 50-70,* pull switch knob out to last notch, then depress the spring-loaded latch button on switch while pulling the knob and rod assembly out of switch. See figure 10-93.

3. *On 1948 model switch,* remove mounting nut using Wrench J 1589, then remove switch from grille. Remove control rod by depressing the retaining spring.

3a. *On 1949 Series 50-70,* remove mounting nut and anti-rattle spring, using Wrench J 1589 or a wide blade screwdriver, then remove switch from panel.

4. When installing lighting switch, connect wires according to color codes as shown on chassis wiring circuit diagrams in Section 10-J. When connecting battery ground cable use care to properly wind the clock (par. 10-21, *d*).

e. Test of Thermo Circuit Breaker

To test the thermo circuit breaker, remove lighting switch from instrument panel to avoid possible damage to adjacent instruments.

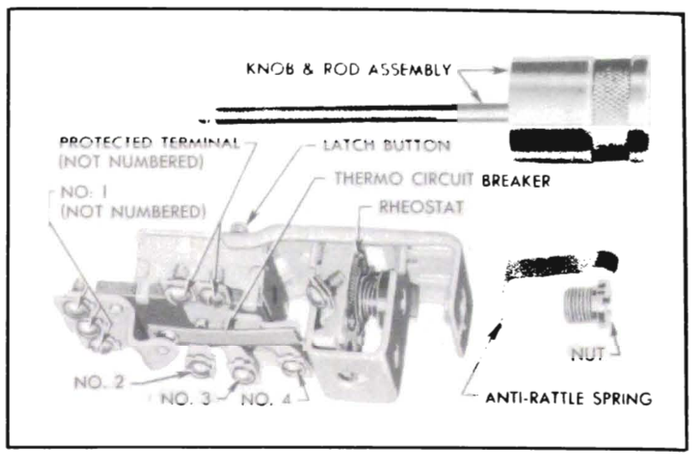

Figure 10-93—1949 Series 50-70 Lighting Switch

Since the current required to open the circuit breaker contacts depends somewhat on outside temperature, the circuit breaker should be tested at normal temperature (70° to 80° F.).

1. Connect an ammeter and a carbon-pile rheostat in series with the No. 1 terminal of lighting switch and positive terminal of a 6-volt battery, and set rheostat to provide maximum resistance. Rheostat must have capacity for 42 amperes and be adjustable down to .14 ohms.

2. Connect the protected (not numbered) terminal of lighting switch to negative post of battery.

3. Adjust rheostat to give 42 amperes. The circuit breaker should start vibrating in three minutes or less.

4. Adjust rheostat to give 30 amperes on ammeter. The circuit breaker should remain closed indefinitely at 30 amperes.

5. If circuit breaker does not operate as specified the lighting switch assembly should be replaced. The circuit breaker is not adjustable and no attempt should be made to alter the calibration by bending the bi-metal blade. The contact points must not be filed or sanded.

10-54 HEADLIGHTS AND CONTROLS

a. Headlamp Assembly

The headlamp assembly on each front fender consists of a body, wiring, connector, mounting ring, sealed beam unit, retainer ring, door, and gasket. See figure 10-94.

The headlamp body is attached to the fender with a gasket between body and fender to provide a water-tight seal. The wiring to which the connector is attached extends through rear

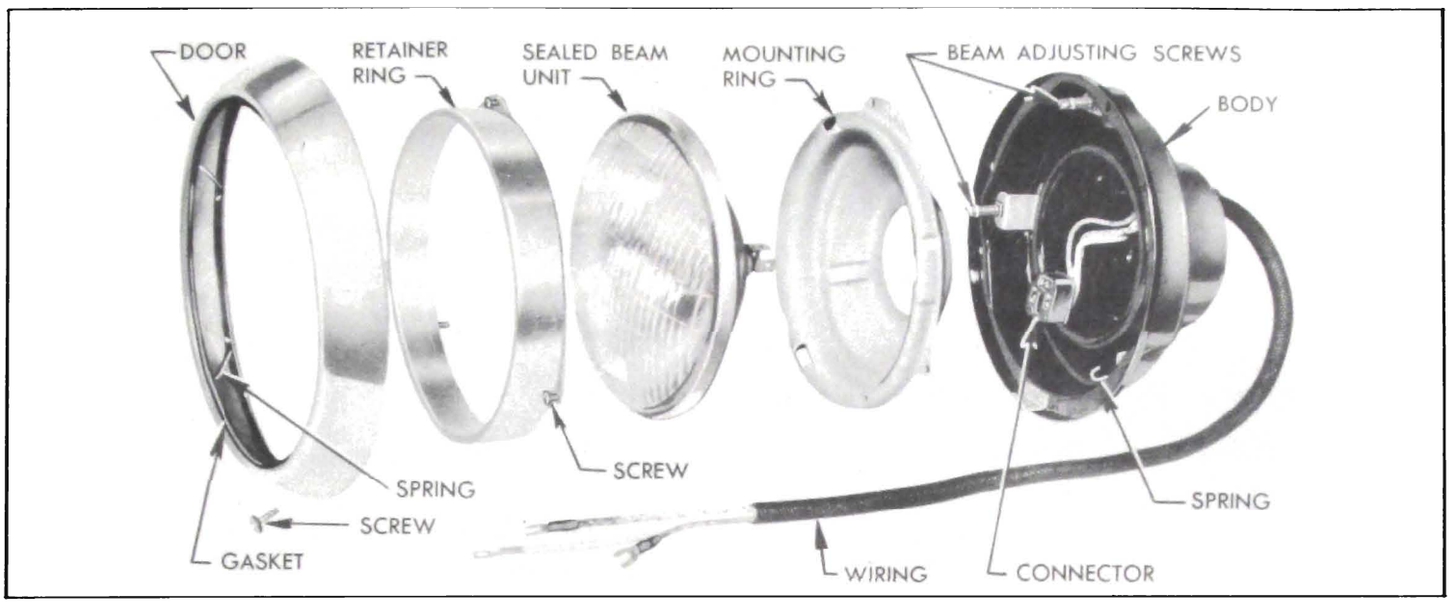

Figure 10-94—Headlamp Disassembled

of body and connects to a terminal block on the radiator mounting strap. The mounting ring, which supports the sealed beam unit, forms a ball and socket joint with the body, to which it is attached by one coil spring and two beam adjusting screws. The sealed beam unit is attached to the wiring connector and is held in the mounting ring by the retaining ring which is attached to mounting ring by three screws. The headlamp door surrounds the retaining ring and is attached to the body by a lug at the top and one screw at bottom of door. A rubber gasket, held in the door by W-shaped retaining springs, forms a seal between door and retainer ring. See figure 10-94.

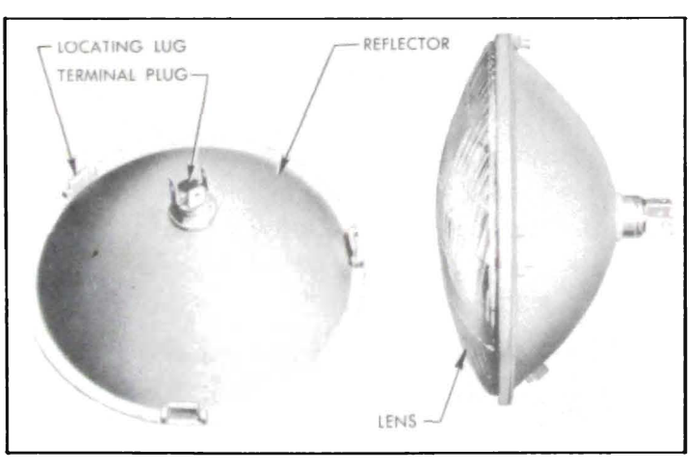

Figure 10-95—Headlamp Sealed Beam Unit

b. Sealed Beam Unit and Headlight Beams

The sealed beam unit consists of a lens, reflector, terminal plug, and two lamp filaments assembled into one securely sealed unit. See figure 10-95. The lamp filaments are located with respect to the reflector so that two separate and distinct headlight beams may be obtained, depending upon which filament is burning.

When the lower lamp filament is burning, an upper or straight forward light beam is obtained. The upper beam is designed to illuminate the road evenly, and is for use on the highway when no other vehicles are approaching. See figure 10-96.

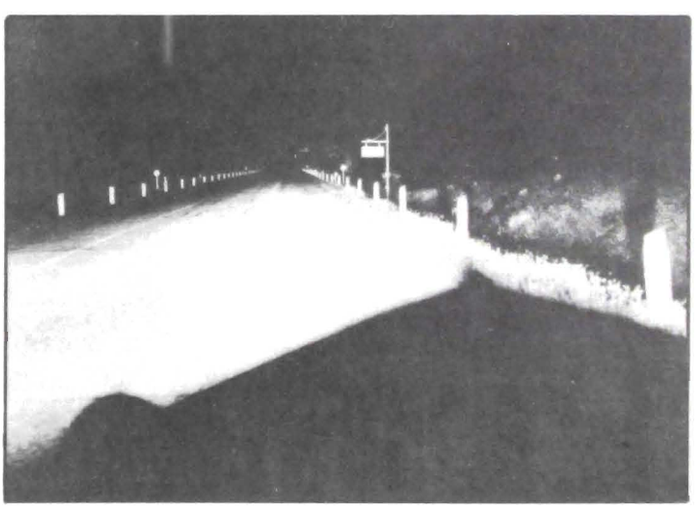

Figure 10-96—Light Distribution with Upper Headlight Beam

When the upper lamp filament is burning, a lower or depressed light beam is obtained. The lower beam is designed so that it does not throw a dazzling light into the eyes of an approaching driver. At the same time, the distribution of light is such that the right side of road is illuminated as far ahead as is practicable without causing glare on curves. See figure 10-97. The lower beam is intended for use in traffic and on the highway when meeting other vehicles.

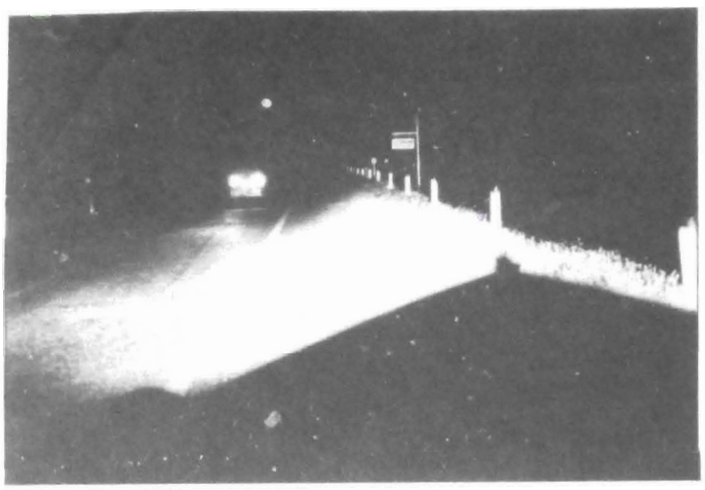

Figure 10-97—Light Distribution with Lower Headlight Beam

c. Dimmer Switch

The driver may select the upper or lower headlight beam as traffic and road conditions demand by operating the dimmer switch mounted on the toe panel in a convenient position for the left foot.

The dimmer switch opens and closes the circuits to the upper and lower lamp filaments in both sealed beam units, thereby alternately raising and lowering the headlight beams with each successive operation of the switch. Depression of switch button turns the rotary contacts one position within the switch. The spring-loaded button automatically returns to the reset position when released. The switch contacts overlap so that the new circuit is closed before the previous one is opened, in order to prevent both beams being off at the same time during operation of the switch.

d. Headlight Beam Indicator

Whenever the upper headlight beams are lighted, a beam indicator bulb on the instrument panel also lights, producing a small spot of red light at the top of the speedometer between the words "Bright Lights". This indicator warns the driver that the upper beams are lighted. *For safety reasons, he should never pass an approaching car with the beam indicator showing red.*

10-55 HEADLAMP SEALED BEAM UNIT REPLACEMENT AND ADJUSTMENT

a. Replacement of Sealed Beam Unit

When a sealed beam unit is burned out or broken it must be replaced as a unit assembly. Two types of sealed beam units are available. In one type, the glass lens and a glass reflector are fused together. In the other type, the glass lens and a metal reflector are assembled together with a gasket to provide a tight seal. Both types are interchangeable. See figure 10-95.

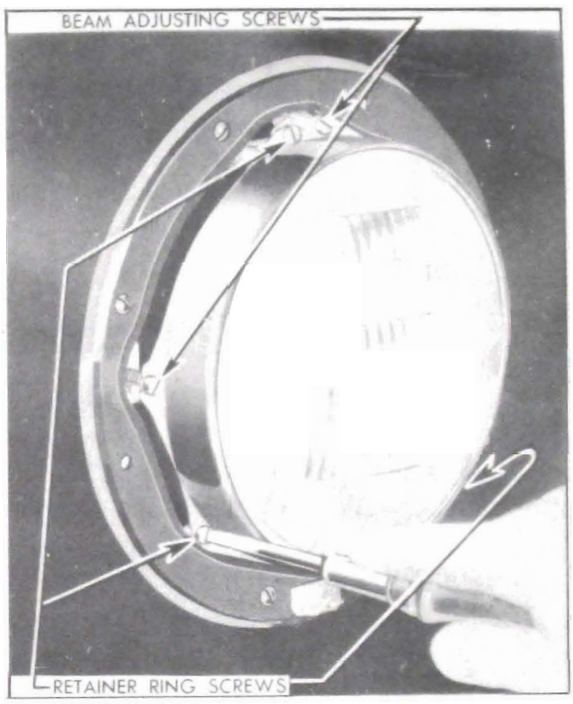

Figure 10-98—Removal of Sealed Beam Unit Retainer Ring

1. Remove screw at bottom of headlamp door, swing door outward at bottom and lift up to remove.

2. Remove the three retainer ring screws but do not disturb the two beam adjusting screws, then remove retainer ring. See figure 10-98.

3. Remove sealed beam unit from mounting ring and separate it from the wiring connector.

4. Install new sealed beam unit by reversing removal procedure. The lens is marked "TOP" and the reflector has three lugs which fit into notches in the headlamp mounting ring. See figure 10-99. Before installation of headlamp door, adjust headlamp for proper aim as described below.

b. Headlamp Aiming Adjustment

The headlamps must be properly aimed in order to obtain the maximum road illumination and safety that has been built into the headlighting equipment. The headlamps must be checked for proper aim whenever a sealed beam unit is replaced and after any adjustment or repairs of the front end sheet metal assembly.

Headlamp aiming machines are in general use. When using one of these machines make

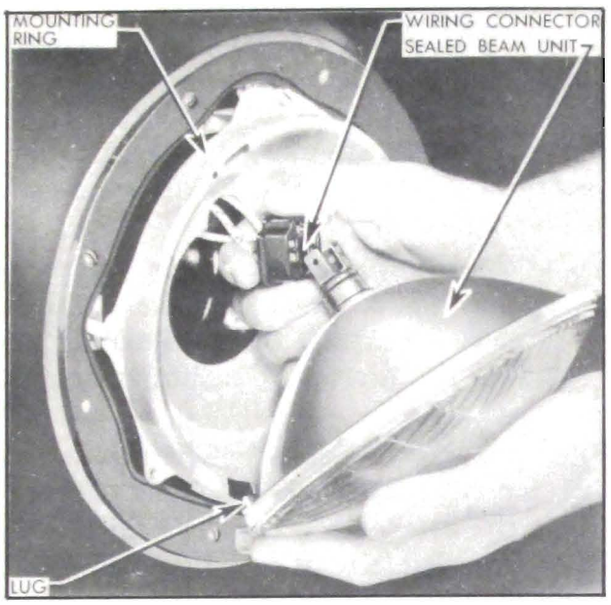

Figure 10-99—Installation of Headlamp Sealed Beam Unit

certain that it is in proper codition, and carefully follow the instructions of the manufacturer. Headlamp aiming charts are also available and will give good results if used properly; see subparagraph *c* below.

Regardless of method used for checking headlamp aim, car must be at curb weight, that is, with gas, oil, water, and spare tire, but no passengers. Tires must be uniformly inflated to specified pressure (par. 6-8). If car will regularly carry an unusual load in rear compartment, or a trailer, these loads should be on car when headlamps are checked. Some states have special requirements for headlamp aiming adjustment and these requirements should be known and observed.

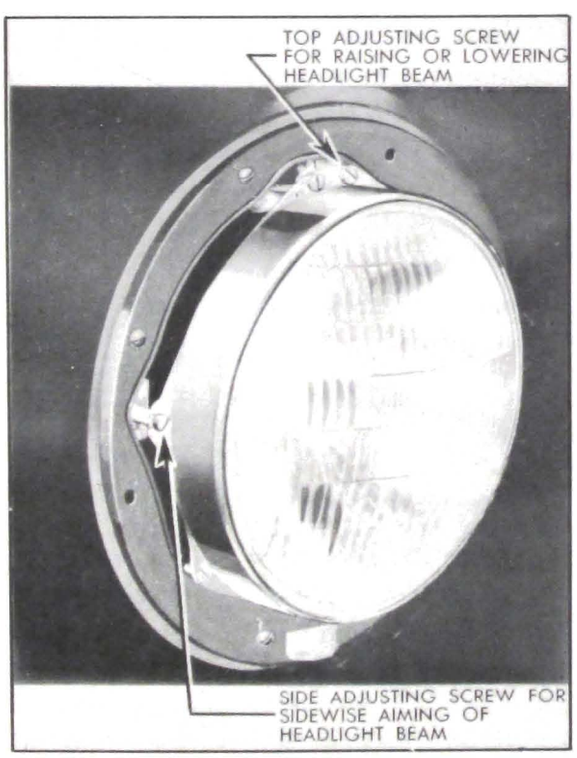

Figure 10-100—Headlamp Aiming Adjustments

Horizontal and vertical aiming of the headlamp beam is provided by the two beam adjusting screws which move the mounting ring in the body against the tension of the coil spring. There is no adjustment for focus since the sealed beam unit is set for proper focus during manufacturing assembly. If headlamps require adjustment for proper aim, proceed as follows:

1. Remove screw at bottom of headlamp door, swing door outward at bottom and lift up to remove.
2. Adjust light beam up or down as required by turning the top beam adjusting screw. See figure 10-100.
3. Adjust light beam to right or left as required by turning the side beam adjusting screw.
4. Check final setting of headlamps after installing headlamp doors.

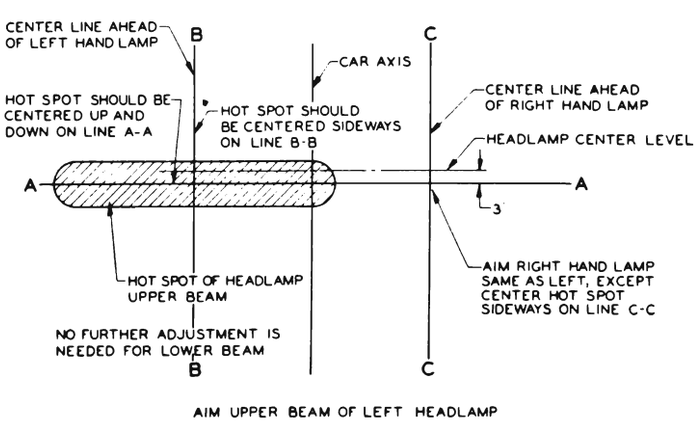

Figure 10-101—Headlamp Aiming Chart

c. Use of Headlamp Aiming Chart

If a headlamp aiming machine is not available a chart may be prepared as shown in figure 10-101. It is desirable to make the chart on a large panel of plywood or other suitable material, painted flat white, so that it can be shifted into proper alignment with car, as explained later. Note that the chart consists of two horizontal and three vertical lines. The upper horizontal line is located at the same distance from floor as the center of headlamps and the lower horizontal line (A-A) is 3"below the headlamp center line. Where State laws require a loading allowance be governed by these requirements for the lower line. Vertical lines B-B and C-C are located at the center of head-

lamps and equally distant from the center vertical line which corresponds to axis of car.

When using the headlamp aiming chart, place car on a level stretch with chart placed 25 feet ahead of both headlamp lenses, and parallel to them. Shift chart sideways as required to bring the center vertical line into exact alignment with the center of radiator ornament and center of windshield division molding.

Set lighting switch in "driving" position and operate dimmer switch to give upper beam. Cover right headlamp and note light pattern made on chart by the left headlamp. The center of zone of highest light intensity should fall on the intersection of horizontal line A-A and the vertical line B-B as shown in figures 10-101 and 10-102. Cover left headlamp and check right headlamp in the same manner.

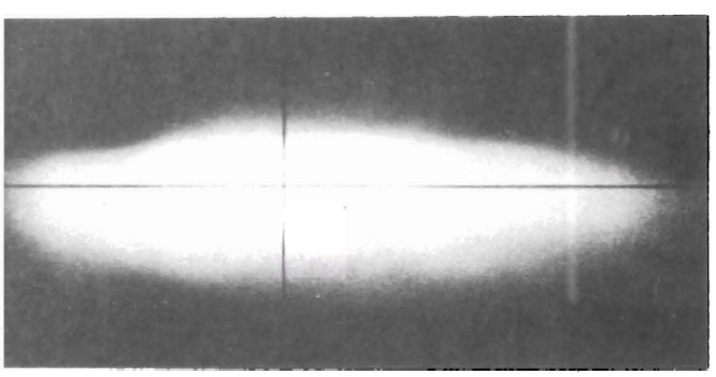

Figure 10-102—Light Beam Properly Centered on Vertical and Horizontal Lines of Chart

10-56 PARKING, SIGNAL, TAIL, STOP, AND LICENSE LAMPS

a. Front Fender Parking and Signal Lamps — All Models

The small lamps mounted on the front fenders are combination parking and direction signal lamps. Each lamp contains one 21-3 CP lamp bulb which may be replaced by removing the lamp door (1948) or cover and lens assembly (1949). See figure 10-103. The pins on bulb and slots in socket are offset to prevent reversing position of 21 CP and 3 CP filaments when installing a new bulb.

When the lighting switch is in the "Parking" position (first notch out) the 3 CP filament in each lamp bulb burns. This circuit is protected by the thermo circuit breaker on the lighting switch.

When the direction signal switch is operated, the 21 CP filament flashes on and off in the lamp on the side of the car for which a turn is indicated. This circuit is independent of the lighting switch and is protected by a fuse. In *1948 models*, the fuse is located in a splice type fuse holder clipped to the steering column brace under the cowl. In *1949 Series 50-70*, the fuse is located on the fuse block under the cowl.

b. Tail, Stop, and Signal Lamps — 1948 Models

1948 models are provided with two combination tail, stop and direction signal lamps mounted on the body. Each lamp contains a 21-3 stop and tail light bulb. The 21 CP stop light filament is lighted when the brakes are applied, and the 3 CP tail light filament is lighted when the lighting switch is in either the "Parking" or "Driving" position.

The *Series 40* lamp contains a separate 21 CP single contact bulb for the direction signal light. The *1948 Series 50-70* lamp contains a separate 21-3 CP bulb for the direction signal light; the 21 CP filament provides the light

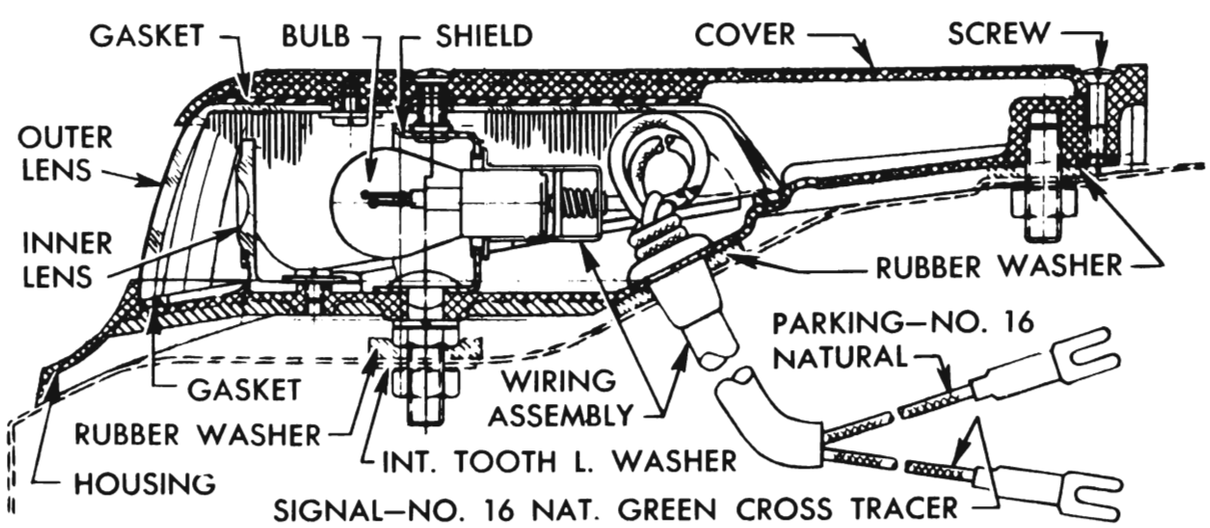

Figure 10-103—Parking and Signal Lamp—1949 Series 50-70

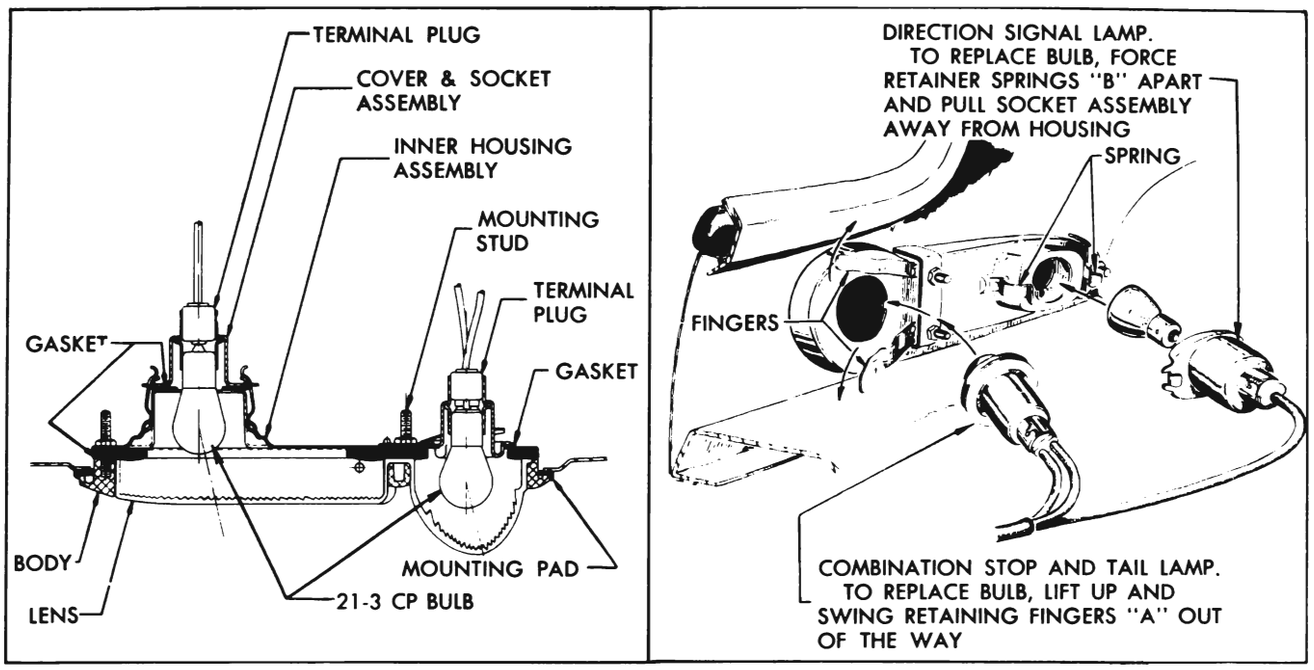

Figure 10-104—Tail, Stop and Signal Lamp—1948 Series 50-70

and the 3 CP filament is inactive. See figures 10-104 and 10-105.

Lamp bulb replacement is made from inside the rear (trunk) compartment. The pins on bulb and slots in socket are offset to prevent reversing position of the 21 CP and 3 CP filaments when installing a new bulb.

To replace tail and stop light bulb on *Series 40*, and the direction signal light bulb on *1948 Series 40-50-70*, spring the retaining clip out and pull out socket plate. Retaining clips are different in width to prevent reversal when reinstalling socket plate. See figures 10-104 and 10-105.

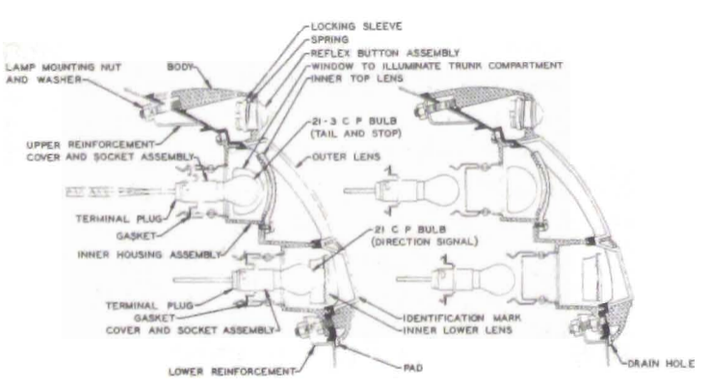

Figure 10-105—Tail, Stop, and Signal Lamp—Series 40

To replace tail and stop light bulb on *1948 Series 50-70*, lift retaining fingers and rotate away from lamp socket plate, then pull out socket and replace bulb. When installing socket make sure that depression in socket plate enters alignment notch in housing. See figure 10-104.

c. Tail, Stop and Signal Lamps — 1949 Series 50-70

1949 Series 50-70 are provided with combination tail, stop and dircetion signal lamps mounted on each rear fender. Each lamp contains one 21-3 CP lamp bulb, which may be replaced by removing the lamp door and lens assembly which is attached by 3 captive screws. See figure 106. The pins on bulb and slots in socket are offset to prevent reversing position of 21 CP and 3 CP filaments when installing a new bulb.

When the lighting switch is in either the "Parking" or "Driving" position, the 3 CP filaments in both lamp bulbs burn to provide tail lights. This circuit is protected by the thermo circuit breaker on light switch.

When the brakes are applied, the 21 CP filament in both lamp bulbs burn to provide stop lights. When the direction signal switch is operated, the 21 CP filament flashes on and off in the lamp on the side of car for which a turn is indicated. The 21 CP filament in the opposite lamp burns steadily if brakes are applied at same time, or remains out if brakes are not applied.

The stop and signal light circuits are independent of the lighting switch and are protected by a fuse on the fuse block under the cowl. See chassis wiring circuit diagram in Section 10-J.

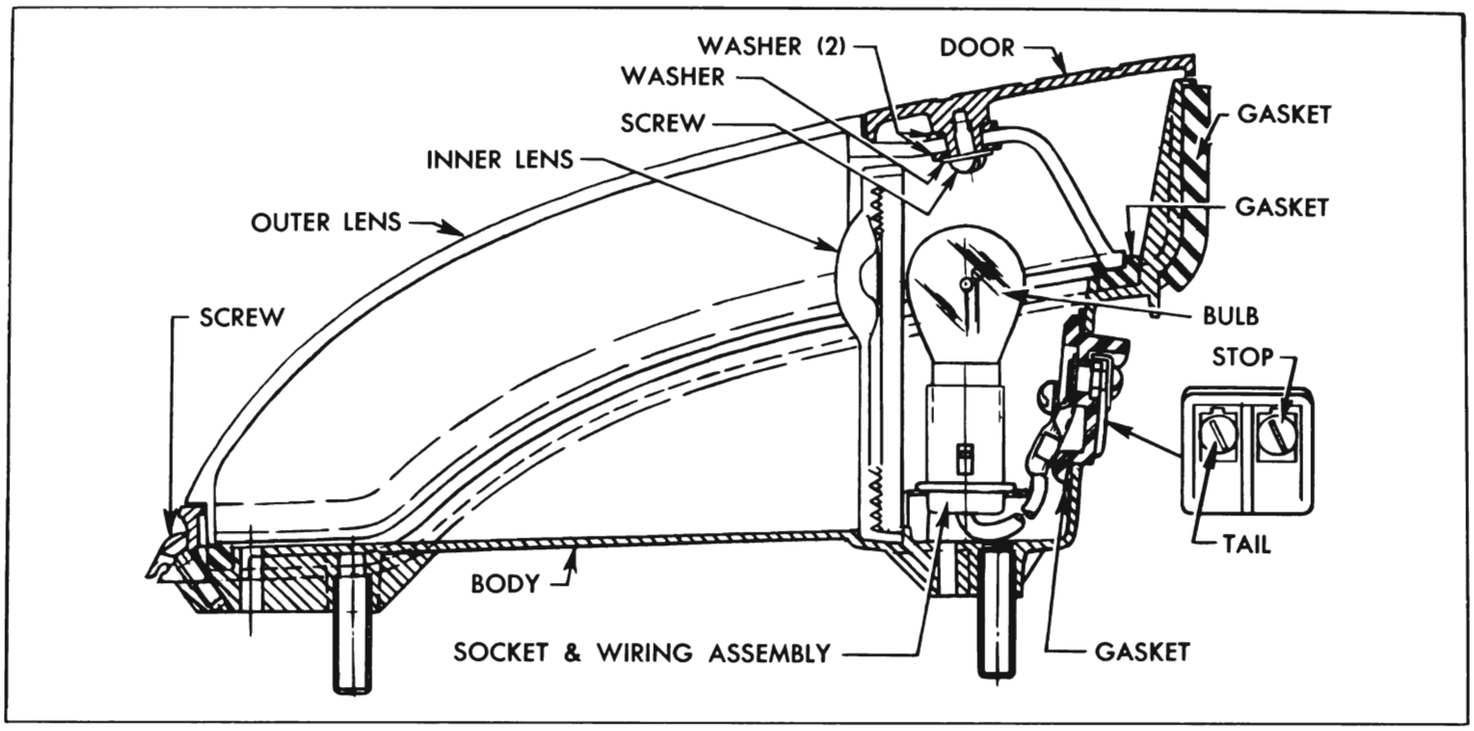

Figure 106—Tail, Stop, and Signal Lamp—1949 Series 50-70

d. Rear License Lamps — All Models

On *Series 40* the rear license lamp is mounted above the rear compartment (trunk) lid handle. It contains a 3 CP lamp bulb which operates in conjunction with the tail lamps. The bulb is replaced by removing the two screws holding the lamp cover in place. See figure 10-107.

On *Series 50-70*, the rear license lamp is mounted in a protected position in rear bumper above the license plate. It contains one 3 CP lamp bulb which operates in conjunction with the tail lights and the circuit is protected by the circuit breaker on lighting switch. To replace lamp bulb, remove two coin slotted sleeve nuts which attach the lamp socket and wire assembly. See figure 10-108.

10-57 INTERIOR LIGHTS AND CIGAR LIGHTERS

a. Instrument Panel Lights and Switches

The speedometer and gauges are illuminated by four 2 CP lamp bulbs, and the clock is illuminated by one 2 CP lamp bulb. These bulbs are mounted on forward side of instrument panel to provide indirect lighting. The instrument panel light circuits are protected by the thermo circuit breaker on lighting switch.

On *1949 Series 50-70*, the instrument panel lights are controlled by the lighting switch. When the lighting switch knob is in either the "Parking" or "Driving" position, the panel lights may be increased in brilliance by turning the knob counterclockwise. Turning knob clockwise decreases brilliance of lights, and at limit of clockwise travel the lights are turned off.

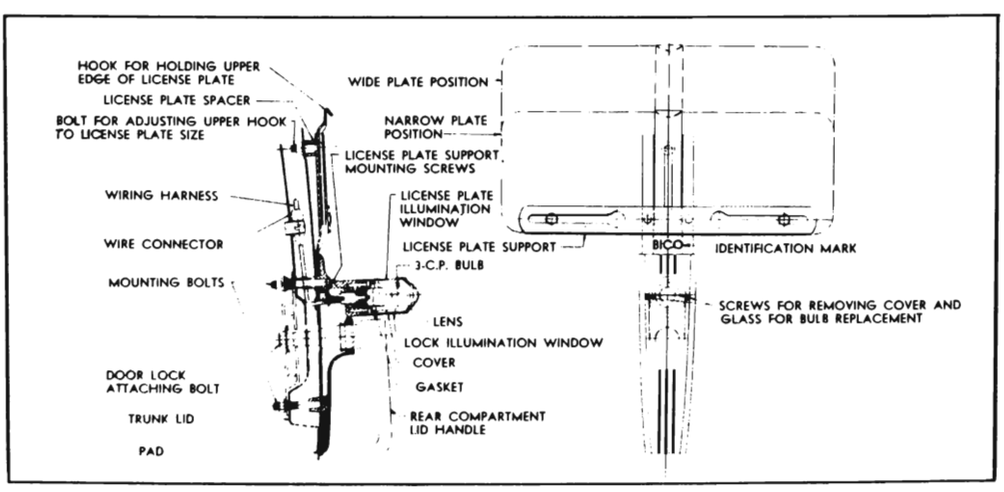

Figure 10-107—Rear License Lamp—Series 40

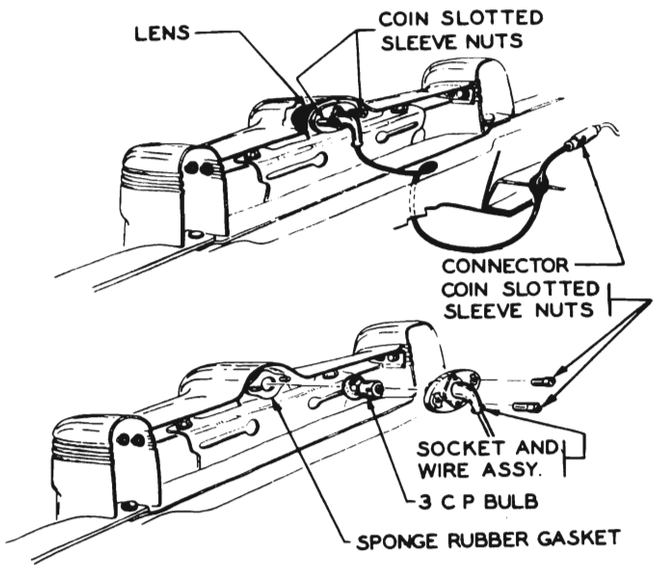

Figure 10-108—Rear License Lamp—1948 Series 50-70

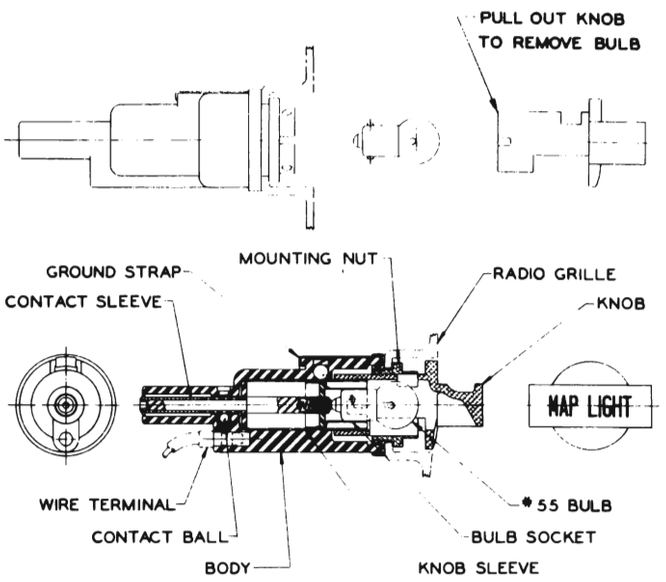

Figure 10-109—Map Light Switch—1948 Model

On *1948 models*, the instrument panel lights are controlled by the lighting switch and a separate instrument panel light switch mounted on the radio speaker grille. These lights cannot be turned on except when the lighting switch is in either the "Parking" or "Driving" position. The instrument panel light switch is a "push-pull" type having four positions as follows:

Off.....Knob pushed all the way in
Bright.....Knob pulled out one notch
Medium.....Knob pulled out two notches
Dim.....Knob pulled to last notch

A fuse located on the *1948 model* instrument panel light switch protects the switch, instrument and clock light circuits. The fuse can be replaced without removing the switch. The upper terminal on switch is the hot or live terminal. The lower terminal feeds the instrument and clock lights.

The *1948 model* instrument panel light switch can be removed from the radio grille by removing the knob and the mounting nut. Loosen set screw on underneath side of knob, using a $^{3}/_{32}$" Allen wrench, then pull knob out. Use Wrench J 1589 to remove switch mounting nut, then remove switch and disconnect wires.

b. Map Light Switch Assembly

A map and front compartment light switch assembly is mounted on the radio speaker grille in *1948 models*, and in the lower right side of the instrument cluster in *1949 Series 50-70*. The switch makes contact to turn on the light when the "MAP LIGHT" knob is pulled out. The map light circuit is protected by the thermo circuit breaker on the lighting switch.

The switch knob may be removed for replacement of lamp bulb by firmly pulling it farther out from the "light on" position. When the knob is installed, align the key on knob with the slot in knob sleeve. The *1948 model* switch assembly is attached by a special nut which may be removed with Wrench J 1588, after removal of switch knob. See figure 10-109. The *1949 Series 50-70* switch assembly is attached by two screws which may be removed after removal of knob.

c. Instrument Panel Compartment Light

The instrument panel compartment (glove box) is lighted by a 2 CP lamp bulb mounted in a light switch attached to top edge of the compartment. The spring-loaded switch makes contact when the compartment door is opened. As the door is closed it depresses the switch button to break contact and turn the light off. This circuit is protected by the thermo circuit breaker on the lighting switch.

d. Dome Lamp and Switches

The dome lamp is controlled by a switch on the center body pillar or over rear quarter window on left side. On all cars except *1948 Series 50-70* sedans, which have courtesy lamps, the dome light is also controlled by spring-loaded jamb switches on both front and the right rear door hinge pillars. The jamb switch automatically turns dome light on when door is opened.

On *1948 models*, the dome lamp in closed bodies contains one 6 CP double contact lamp bulb; in convertible coupes one 2 CP single contact bulb is used. On *Series 40*, the dome lamp wiring is protected by the thermo circuit

breaker on lighting switch, while on *Series 50-70*, a fuse is used. This fuse is located in a splice type fuse holder clipped to the steering column brace under the cowl.

On *1949 Series 50-70*, the dome lamp in closed bodies contains one 15 CP double contact lamp bulb; in convertibles one 2 CP single contact bulb is used. The dome lamp wiring is protected by a fuse on the fuse block under the cowl.

Dome lamp wiring circuit diagrams are given in Section 10-J.

e. Courtesy Lamps — 1948 Series 50-70

1948 Series 50-70 sedans are provided with four courtesy lamps. In the front compartment these lamps are mounted on each side of the front seat frame, and are controlled by spring-loaded jamb switches operated by the front doors. In the rear compartment these lamps are mounted on the rear seat frame and are controlled by a spring-loaded jamb switch operated by the right rear door.

1948 Series 50-70 convertible coupes are provided with two courtesy lamps, one mounted on each side of the front seat frame. These courtesy lamps are controlled by spring-loaded jamb switches operated by the front doors.

f. Luggage Compartment Light

On *Series 40*, a plastic window in the side of each tail lamp provides light for the luggage compartment when the tail lamps are lighted.

On *Series 50-70*, the luggage compartment lamp is mounted on the rear compartment lid and contains a 2 CP lamp bulb. A switch built into the lamp assembly automatically turns the light on when rear compartment lid is raised, and turns light off when lid is lowered. On *1948 models*, the luggage compartment lamp is connected to the tail lamp circuit so that it is necessary to have the tail lamp turned on to have the luggage compartment lamp operate. On *1949 Series 50-70*, the luggage compartment lamp is connected to the dome lamp circuit so that it is independent of the tail light.

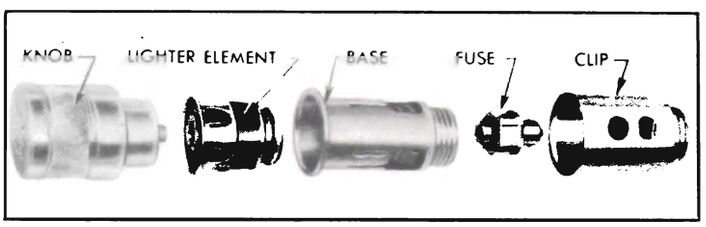

Figure 10-110—Cigar Lighter, Disassembled—1949 Series 50-70

g. Cigar Lighters

Both the front and rear cigar lighters are heated by pressing the knob in until it latches. The knob will automatically return to the "off" position when heated to proper temperature. A replaceable thermal fuse located in the lighter base protects the lighter element against overheating if knob is manually held in for too long a period. See figure 10-110.

The rear cigar lighter on *Series 50-70* is connected to the dome light circuit and the wiring is protected by the same fuse which protects the dome light wiring.